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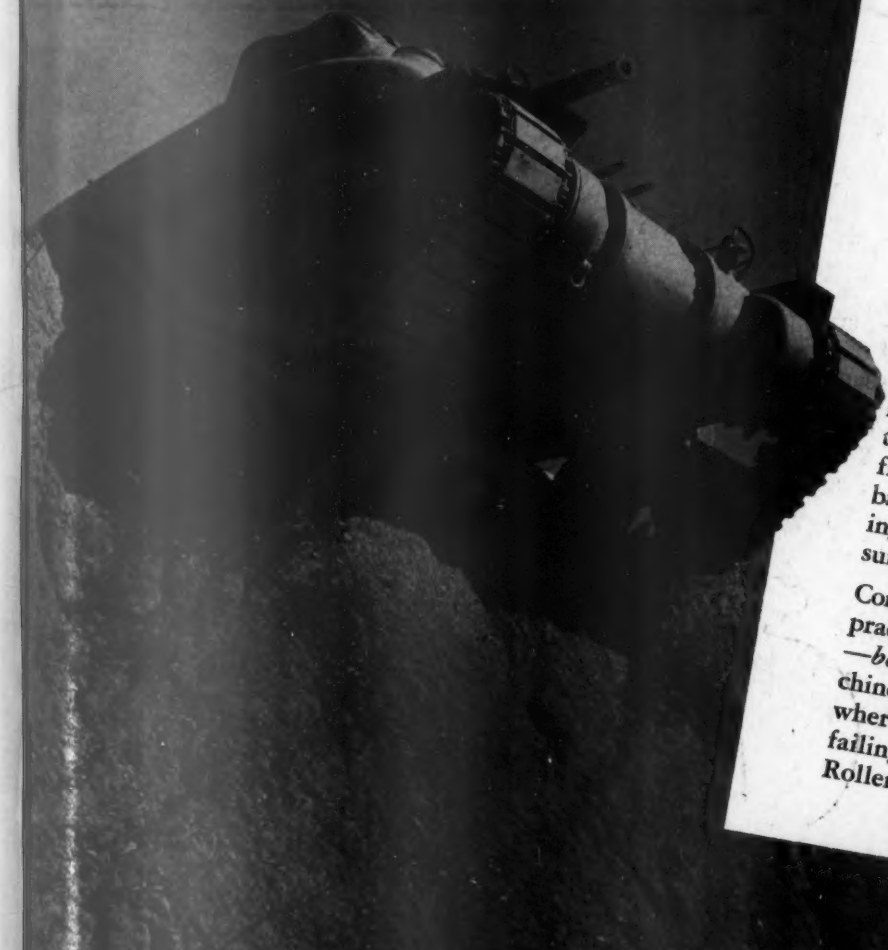

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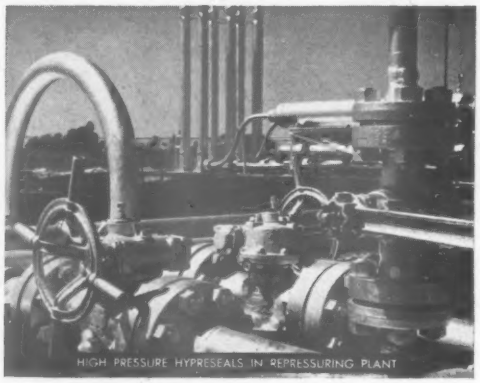

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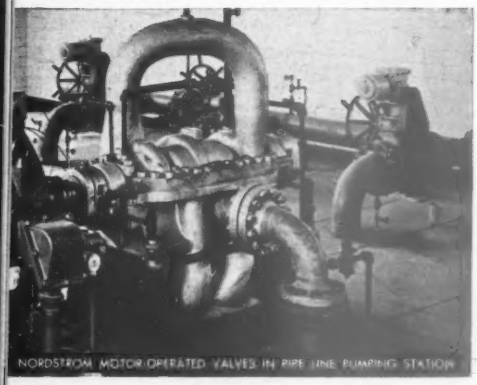

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HYPRESEAL VALVES ON PIPE LINE

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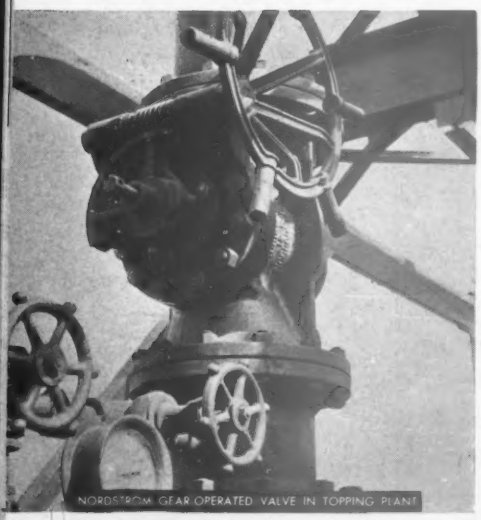

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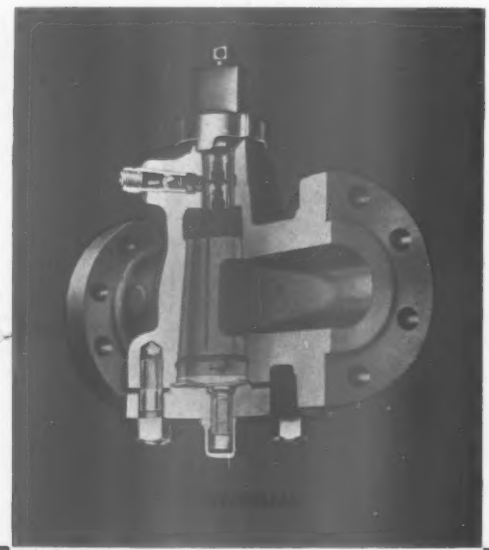

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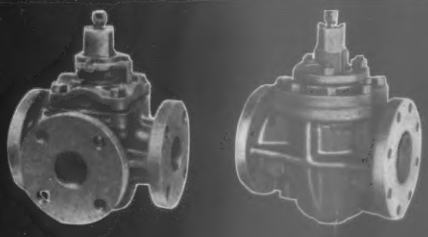

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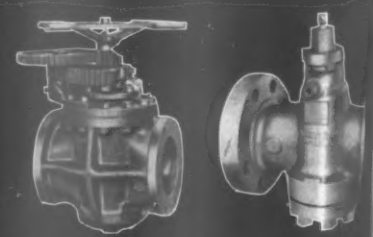

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General Heading: BAKER MODEL "K" CEMENT RETAINER

Unit No. A-21

Subject:

Reasons Why the Baker Cement Retainer is "First Choice" for Cementing, Well Repair and Well Completion Operations

Index: 250.1
Date: February 25, 1943
Page: 1 of 1 p.

USE IS PROOF

The Baker Model "K" Cement Retainer has been used successfully in thousands of oil wells in fields throughout the world. The original Baker Cement Retainer was invented (and the name "Cement Retainer" coined) some 30 years ago and the present tool embodies the knowledge and experience gained during that time in both manufacturing and running many Cement Retainers.

It is this accumulation of skill and experience that goes with every Baker Cement Retainer run into the hole today, and is the reason why this device is "first choice" for present-day cementing, well repair and well completion operations.

Service Note

Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

Product No. 400
Baker Model "K" Cement Retainer (with Circulation Joint)

USE:

Provides a safe, sure means of placing cement through tubing or drill pipe at the place where it will be most effective, at any pre-determined point behind casing or liner; or around the shoe. It is adaptable to carry pressure within the safety factor of the casing.

APPLICATIONS

Recementing
Cementing Behind Sections of Pipe
Reducing Gas/Oil Ratios
Plugging Off Bottom Fluids
Plugging Back to Upper Zones
Cementing Off to Perforate for Production
Cementing Two Strings Together
Cementing Low-Pressure Zones
Use as a Casing Bridge Plug

IMPORTANT FEATURES:

POSITIVE BACK-OFF

There are two important construction features which assure positive sealing against casing and eliminate any possibility of fluid by-pass. Tool is hydraulically tripped and when set, the oil resistant packing forms a positive seal against the casing. One feature is the provision of a lead ring on either end of the packing member, which, when the latter is expanded, hermetically seals the ends of the packing, preventing any possibility of fluid by-pass. The second important feature is the use of flow stop discs, small metal discs located in the body of the Retainer underneath the packing. These discs act as valved fluid ports and prevent any flow of the packing into the Retainer Body when the packing is compressed.

RETAINER WILL STAY WHERE SET

Two sets of annular, segmented wickered slips prevent movement of the tool, once it is set, either up or down the hole.

EFFICIENT BACK-PRESSURE VALVE

The Ball Back-Pressure Valve, which becomes operative immediately after retainer is set, prevents return or equalizing of the slurry.

FLUID CAN BE BLED OFF

At any time during circulating or cementing operations, fluid can be by-passed through Circulation Joint, which is run just above the Cement Retainer.

HIGH PRESSURE POSSIBLE

The Baker Cement Retainer will safely withstand any pressures that can be imposed within the safety factor of the casing in which it is set.

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States — Page 110

CRUDE PRODUCTION 3,894,125 bbl. daily average—up 29,725 bbl. One year ago 4,077,475 bbl.

CRUDE STOCKS 234,239,000 bbl. as of Feb. 13 — up 1,416,000 bbl. One year ago 254,463,000 bbl.

GASOLINE STOCKS 92,109,000 bbl. as of Feb. 13—up 1,856,000 bbl. One year ago 104,554,000 bbl.

RESIDUAL FUEL-OIL STOCKS 70,666,000 bbl. as of Feb. 13—down 429,000 bbl. One year ago 88,759,000.

GAS OIL AND DISTILLATES 34,292,000 bbl. as of Feb. 13—down 1,211,000 bbl. One year ago 37,465,000.

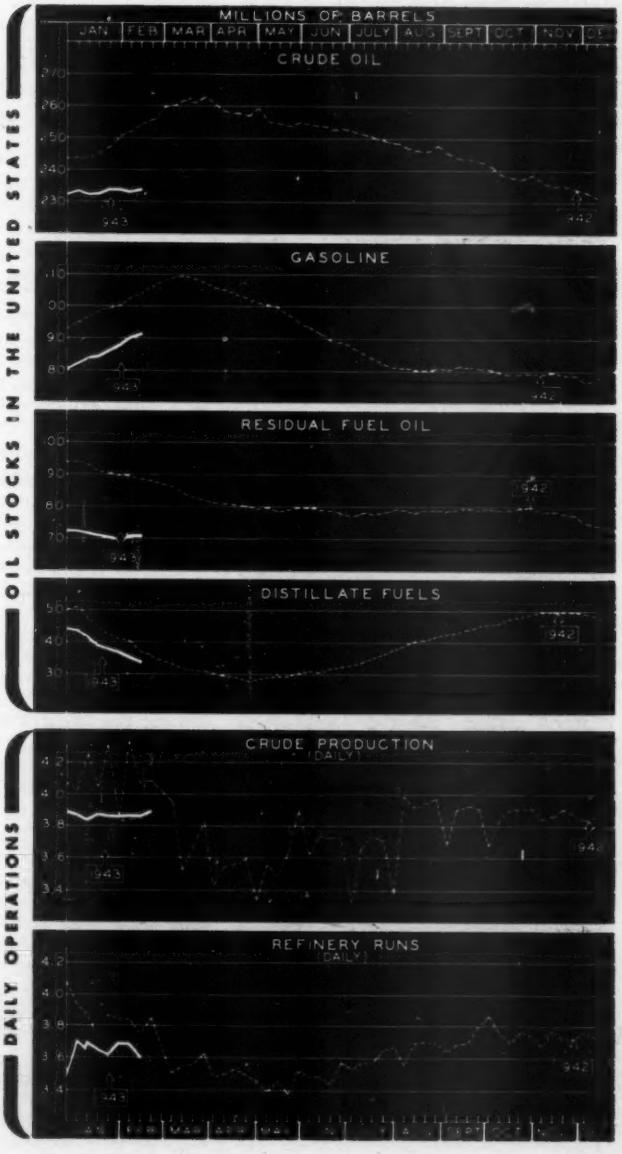
REFINERY RUNS 3,605,000 bbl. daily week ended Feb. 13—down 87,000 bbl. One year ago 3,764,000.

Refinery report delayed by holiday.

REPORTS covering the first 2 months show that the petroleum industry's producing operations so far this year have been in better balance than they were over a large part of 1942. Crude-oil production up to February 20 was 6.6 per cent under the same period in 1942 and about 4 per cent under the average daily production of last December. In contrast to the situation that prevailed during March-December, 1942, supplies so far this year when the entire country is considered have been adequate. In fact, from December 26 to February 13—the latest data available—a little over a million barrels of crude oil were added to storage. The additions to storage during this period included: Kansas, 671,000 bbl.; Mississippi, 315,000 bbl.; New Mexico, 694,000 bbl.; Texas, 200,000 bbl., and California, 450,000 bbl. Oklahoma was the only area in which there was a substantial reduction in crude-oil inventories, the decline totaling 1,429,000 bbl.

THESE data indicate that despite the several transportation problems, the industry has been able to secure a better balance than it had last year in the movement of crude oil from fields to refining centers. A more detailed analysis will, of course, reveal that there are still adjustments in supply to be made. There are refineries in the Mid-Continent and Middle West which are short of crude. A pooling arrangement was recently authorized and government directives were being issued this week which in effect will probably mean that some of the larger refineries will have to reduce their runs to stills in order that greater supplies can be made available to other operators. This program calls for further adjustments and expansion in certain pipe-line operations so that the over-all deficit in District 2 (Mid-Continent and Middle West) will be made up with increased shipments from District 3.

IN refinery operations, generally, supplies have been more in line with demands than they were the latter part of last year. It is now believed that the supplies that can be made available to the eastern part of the United States will be sufficient for the remainder of the winter period. This projection assumes a continuance of the severe rationing program on gasoline and fuel oil effective in the eastern states. With this immediate objective accomplished more attention will be given as to what has to be done later in the year to balance supplies of all products against military and civilian needs.



Midwestern and Southwestern Refiners Split on Pipe-Line Issue

A SHARP cleavage between midwestern and southwestern oil men developed this week over which leg of the 20-in. emergency products pipe line should be built first. The difference in opinion is primarily between refiners in the two districts but producers are almost equally interested because of the crude-oil demand aspects of the decision.

Midwestern refiners, spearheaded by Frank Phillips, chairman of Phillips Petroleum Co., Bartlesville, Okla., and general chairman of PAW District 2, want the eastern segment of the emergency products line built first, from Indiana or Illinois to the Atlantic seaboard.

Southwestern oil men, including producers as well as refiners, attending last week's proration hearing of the Texas Railroad Commission unanimously adopted a resolution calling for construction of the southern leg of the line before the eastern branch is built.

Between the two industry factions is Petroleum Administrator Harold L. Ickes who last week, testifying before the Truman committee of the Senate, declared that he was primarily concerned with fulfilling his duty of supplying petroleum war products at the necessary points with the least possible delay and expenditure of materials. He promised to reconsider the entire project in light of the protest from midwestern refiners.

Informal presentation of data to the Truman committee by partisans from both districts continued this week at Washington and further open hearings will be held later.

Attitude of Texas' operators was expressed in a resolution by C. F. Roeser, general chairman of PAW District 3 which was unanimously adopted at the February 18 proration hearing in Fort Worth. Support was demanded of the Railroad Commission to influence and further construction of the line and to oppose all efforts to delay or change plans and to request PAW to proceed with the project as outlined.

Would Ease Texas Pinch

In submitting the resolution, Mr. Roeser stated that the 20-in. line from the Texas Gulf Coast to Indiana and Illinois would move 235,000 bbl. daily of light petroleum products to meet the eastern demand for fuel in 1943 and 1944. This line will remove some of the products of Texas refineries which are made concurrently with war materials. Mr. Roeser reported that Administrator Ickes had said that opponents seemed to be more interested in the postwar situation than in winning the war.

Many of the railroads in the southwestern area are single track and it would be difficult, Mr. Roeser contended, to transport the 235,000 bbl. of products by rail to a pipe line originating in Illinois or Indiana. The railroads in the East will, on the other hand, have established a regular movement of 300,000 bbl. per day from the terminal of the 24-in. crude oil line to the eastern seaboard during the present year. These railroads will be able to continue this movement after the second leg of the 24-in. line is completed and the 20-in. line is installed from Texas to Illinois.

Refineries in Texas manufacture more than half of the vital petroleum war products in the nation and with the expanded demand for aviation fuel they will have to manufacture even more, the resolution asserted. Byproducts of this wartime operation are piling up and are at such a high level that regular movement must be insured. The line is a war necessity not only because it will relieve the eastern scarcity but because it will permit continued manufacture of war products in the Gulf Coast, Mr. Roeser declared in conclusion.

Pending in the Senate at Washington is a resolution sponsored by nine midwestern senators to stop the project pending an investigation but before this resolution was acted on the Truman committee held a hearing at which Administrator Ickes and J. R. Parten, PAW director of transportation, defended the present plans for immediate construction of the line.

The basis of the opposition is, first, that midwestern refineries have a surplus of gasoline which would not be relieved by construction of this line, and, second, that if the war should end with the line built no farther east than Seymour the major companies which have production in Texas but heretofore have marketed only in the East will be able to ship through this line and compete with midwestern refineries in their normal market.

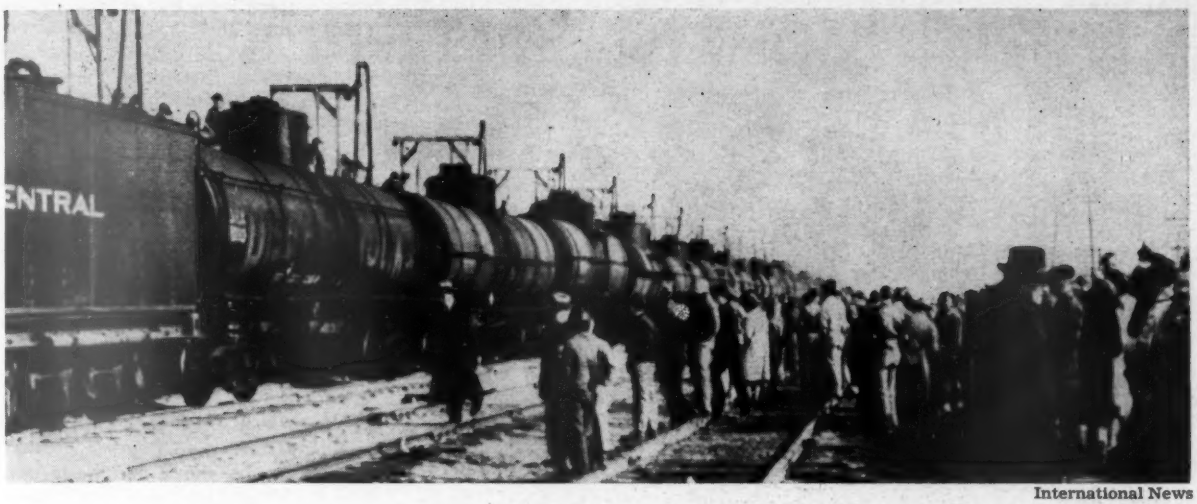
The alternative suggested is that the line be built from some point in Indiana or Illinois east to the New York area, and then the western leg constructed later if found necessary.

Opposition first come from John C. Day, executive secretary of the Western Petroleum Refiners Association. His original protest was rejected by Administrator Ickes, but Mr. Day returned to Oklahoma to gather more data and in the meantime the Phillips

(Continued on Page 50)

Frank Phillips, chairman of Phillips Petroleum Co. and general chairman of PAW District 2, wants eastern leg built first

Charles F. Roeser, Texas independent and general chairman of PAW District 3, spearheads advocates of the southern segment



International News

Train of tank cars standing on a siding at Norris City, Ill., temporary terminus of the WEP line, filling up with crude destined for the eastern seaboard to help relieve the fuel crisis. Part of crowd attending dedication ceremonies can be seen at right. *(See story on p. 50.)*

WEP Operating Plan Disclosed

by Henry D. Ralph

WASHINGTON, D. C. — The War Emergency pipe line, the first half of which has just been put into operation, will function strictly as its name implies — as an emergency war facility.

It will not be a common carrier, will not file tariffs, will not be available for general use of shippers, but will be run by the Government exclusively as considered best for the production and distribution of petroleum war products.

The line is owned by the Defense Plant Corp., a subsidiary of the Reconstruction Finance Corp. All the oil it will carry will be owned outright by the Defense Supplies Corp., another RFC agency. Operation of the line is directed by the Petroleum Administration for War, specifically by the scheduling unit of the Transportation Division but with guidance on some phases from the Refining Division. The physical operator of the line is War Emergency Pipelines, Inc., a private corporation formed by major oil companies who will sell and buy most of the oil moving through it, but WEP is simply a contract-operating agent.

Capacity of the line is 300,000 bbl. per day, but it will not reach this rate for several weeks because all of the pumping equipment has not yet been installed in the completed section between Longview, Tex., and Norris City, Ill. Tankage facilities at the Illinois terminal are not yet adequate to handle capacity traffic. The present plan is to use the line roughly 60 per cent for crude oil and 40 per cent for No. 2 heating oil, both initially and for some months after full capacity is reached. On a daily average this will be 175,000 bbl. of crude and 125,000 bbl. of heating oil. The line to Norris City will hold approximately 1,500,000 bbl., and the oil will be put into it in batches of between 600,000 and 900,000 bbl. each, alternating crude and heating oil, so that each end of the line will be operating 2 or 3 days at a time on each product.

DSC will buy both crude and heating oil at Longview at the posted price plus transportation to Longview. It will sell it at Norris City, f.o.b. tank cars, at cost plus a markup to cover transportation from Longview to Norris City. This markup has been set tentatively at 30 cents per barrel, the same for both crude and heating oil.

Charge Is Arbitrary

This 30 cents per barrel is more or less of an arbitrary figure but is comparable to, or slightly higher, than the pipe-line tariffs for hauls of equivalent distances. However, DSC will absorb all line losses and will load into cars free of charge so the markup is considered to be about the same as privately owned pipe lines would charge. It is probable that this 24-in. line could operate at a much lower cost than lines of half or less diameter under normal, competitive, conditions but this factor was not the governing one. When the line is completed to Philadelphia and New York it is probable that the transportation charge will be 60 cents per barrel for the entire trip, which is roughly the same as the current tanker rate from Gulf Coast ports to New York.

The rail charge for tank-car shipments of oil from East Texas to New York is currently about $1.65 per barrel, while the rail charge from Norris City to New York is $1 or $1.05 per barrel, a difference of 60 cents or twice what the WEP line will charge.

The reason why this 30-cent charge is arbitrary and could just as well be set at any figure desired for bookkeeping purposes is that DSC is the agency which has been paying oil shippers the difference between tanker and rail costs of shipping from Texas to the East Coast. DSC will continue to pay this difference on oil moving through the WEP line. On a typical rail shipment from Texas to New York the shipper would pay 5 cents per barrel gathering charge plus $1.65 rail tariff, would deduct 60 cents (the tanker charge) and bill DSC for the difference. On oil purchased at Norris City the cost delivered in New York will be less because the oil cost 30 cents more in Norris City than in Texas but the rail charge is 60 cents less. Consequently, shippers will bill DSC for 30 cents per barrel less than for an all-rail movement. Thus, shippers by any means will have equal delivery costs and as long as DSC continues to subsidize nontanker

International News

W. Alton Jones, president of WEP, running the first crude oil into a tank car from the new 24-in. line at Norris City, Ill., during the ceremonies last week

transportation it could set the WEP charge at any figure under the rail charge without making any difference either to itself or to shippers.

The buying and selling of the oil will be done by WEP as agent for DSC and as directed by PAW under the plan set up in PAW Directive 63, issued January 20, 1943. This directive refers to priorities in buying and selling but these are not priorities in the ordinary sense of the term and in actual practice they have little real meaning. Actually WEP will purchase all the sweet crude oil of the East Texas type and all the No. 2 heating oil which it can move and which can be obtained with the lowest transportation charges to Longview and with the least disruption to war refineries in the supply area.

East Texas' Role

The production of the East Texas field is currently around 325,000 bbl. daily, and eventually it is hoped to obtain all the crude delivered through the WEP line in that field. Currently around 150,000 bbl. daily have been obtained, and the remaining 25,000 bbl. probably will be arranged by inducing Texas refineries to substitute other crudes for their present takings from East Texas. Some of the pipe lines which are to be reversed and rearranged to feed the "big inch" will necessarily bring in relatively small amounts of crude from outside the East Texas field, but for the most part the 175,000 bbl. daily of crude will come entirely from East Texas.

Crude oil will be purchased from any producer who can connect with the line at Longview, regardless of the priority provisions of Directive 63. But in actual practice this means buying from the purchasing companies which have gathering lines or can get crude and heating oil moved to the Longview area and made available to WEP feeder lines. The priority provision would come into operation in case a big producer in East Texas refused to sell crude at Longview but insisted on buying at Norris City for an eastern war products refinery operated by it; in such a case PAW could, in its discretion, require this company to sell crude before taking any deliveries at the eastern end of the WEP line.

Once crude or heating oil has been sold to DSC the seller looses all control over it and has no claim on its disposition. Thus there will be sellers who do not buy at the eastern end, and buyers who have no production in Texas.

Directive 63 states that priorities for purchase of crude oil at the eastern terminal shall be given to District 1 refineries requiring it for the manufacture of essential war products. Just what these requirements are is a military secret, but it can be said that they total more than the amount of crude which the WEP line will carry, and therefore no one will get any WEP crude except war-products refineries designated by PAW. None of the crude will go to nonwar refineries in District 1 nor for any purpose in District 2. If crude deliveries through the WEP line should exceed requirements of District 1 war-products refineries, PAW would apportion the balance among nonwar refineries on the basis of a percentage of their normal operations, but this situation is not expected to prevail for some time.

In arranging the initial supply for the line, PAW issued WEP a schedule of buying orders, covering the most accessible East Texas crude which could be obtained. DSC will not pay a premium to get East Texas crude away from other purchasers, but PAW is attempting to arrange for purchasers there to release their contracts and replace oil elsewhere. To the extent that East Texas crude is not available to fill the line to capacity, initially or at any time in the future, PAW will order the purchase of sweet crude from the nearest available source. There are no minimum tenders in these operations, as is the case with most pipe lines, and WEP will buy the oil from a 1-bbl.-per-day well, if such crude is made available to it.

Heating Oil Arrangements

The arrangements for heating oil are much the same as for crude. WEP will buy heating oil at Longview and practically all of this is coming from Gulf Coast refineries through pipe lines which have been reversed and converted under the direction of PAW. These lines are still operated as privately owned common carriers and it is understood that they are filing tariffs of 10 cents per barrel for moving heating oil from the Houston-Beaumont area to Longview. The 125,000 bbl. of heating oil per day which the WEP line will move initially is somewhat more than the normal fuel oil production of Gulf Coast refineries which would logically feed into it. Coastal refineries, however, have stocks of fuel oil on hand so that heating oil can be moved at the projected rate for several months, at least. In this movement, also, the WEP line is fulfilling its war emergency function, for unless these stocks of heating oil are moved soon, several war-products refineries would be forced to shut down for lack of storage space.

Disposition of heating oil will be in accordance with PAW Directive 59, governing trainload movements of petroleum products into District 1. Only trainload lots will be shipped out of Norris City, and they will be dispatched only to trainload terminals in the East designated by PAW. It is probable that these shipments will go only to three terminals which are equipped to handle such quantities quickly, thus reducing tank-car turnaround and permitting the operation of a tight shipping and dispatching schedule. Other tank-car terminals in the East will continue to be served by cars loaded at points other than Norris City. Approximately 50,000 bbl. daily will be delivered through a connecting line to Ohio Oil Co.'s trunk north of Norris City for shipment from other loading racks.

THIS WEEK

TRANSPORTATION—Movement of 50,000 bbl. daily to East Coast starts by tank car from Norris City, Ill., terminal of WEP 24-in. . . . Loading racks there eventually will handle 1,160 cars daily—254 at a time. . . . Terminal dedicated at appropriate ceremony February 19. . . . Contractors open more spreads on eastern extension. . . . ¶Fight developing between Midwest and southwestern refiners—over which leg of 20-in. emergency products line will be built first. . . . Squabble now rests before Truman committee, Petroleum Administrator Ickes. . . . PAW indicates leaning toward original plan for Texas-Indiana construction now, eastern extension later on. . . .

REFINING—Directive creating crude-oil pool in District 2 still unissued. . . . ¶Local control over refiners' use of crude spreads. . . . Nebraska supplies earmarked for local processing, out shipments halted, to capacity of internal plants. . . . ¶Individual instructions from PAW, directing specific operations, spreading. . . . Refiners generally accepting such direction, when appraised of necessity. . . .

RUBBER—Second progress report places this year's synthetic production at 241,000 long tons. . . . Cancellations lower butadiene phase of total program to 656,860 long tons. . . . Director Jeffers thinks most of plants, including nonsequenced projects, will be completed by end of year. . . . ¶Butadiene from petroleum—by dehydrogenation, direct butane conversion and naphtha cracking—accounts for 436,860 long tons, holding top position as to source. . . . ¶Formal order issued, freeing camelback for recaps, to encourage maximum service from present passenger tires. . . .

MARKETS—Midwestern refiners fear invasion of territory by southwestern manufacturers—one reason why 20-in. products line from Texas to Indiana is opposed. . . . ¶Tank-wagon distributors, in fuel-oil-rationed area, granted 0.3 cent per gallon increase. . . . ¶Ceilings revised on fuel oil in upper Michigan Peninsula. . . . ¶Arbitrary decision of OPA, rejecting all crude-price representations widely criticized. . . .

PRODUCTION—March quota set, by PAW, at 4,193,800 bbl. daily for all petroleum liquids, net increase of 31,500 bbl. . . . Instructions to Texas that 50,000-bbl. increase should be from Gulf Coast fields causes dissension from West Texas. . . . Commission asks for breakdown on how PAW arrived at its conclusion, why it invaded state's authority to allocate quota among fields. . . . Check of purchasers at Fort Worth hearing failed to substantiate demand. . . .

SUPPLY—Slight improvement continues on East Coast... Four critical weeks ahead, BUT PAW growing more optimistic, sees temporary respite from severe winter shortage. . . . ¶Deliveries by rail decline slightly, to 806,986 bbl. daily by all overland facilities. . . . Box-car shipments of kerosene to New England, averaged 18,713 bbl. daily, more than double previous peak. . . . ¶Bayou pipe-line system now moving 30,000 bbl. of products to Greensboro, N. C., not previously available, to lessen pinch. . . .

EQUIPMENT—New appraisal of oil industry's supply needs under way. . . . Sponsored by civilian defense. . . . May inject new element into equipment picture, foreign to PAW. . . . ¶Some 514,000 tons of surplus oil country tubular goods reshuffled in last 3 months, by exchanges, bringing seller and consumer together through PAW survey. . . .

Baffles and roof support installed in a gondola railroad car preparatory to diversion for transportation of petroleum products. This conversion technique is applied at the Canton, Ohio plant of Timken Roller Bearing Co.

RUBBER PROGRESS REPORT

Reduced program will permit production of 241,000 long tons of synthetic during 1943

by Henry D. Ralph

WASHINGTON, D. C. — The synthetic - rubber - plant construction program as recently slowed down by the War Production Board will result in completion of 45.6 per cent of the butadiene program on schedule so that capacity for production of 400,000 tons equivalent of buna-S rubber will be completed by the end of the second quarter of this year, it was revealed in the second progress report of Rubber Director William M. Jeffers.

The report explains the way in which competition for critical component parts resulted in WPB directives for scheduled completion of only parts of the entire rubber program, but Mr. Jeffers anticipates that the balance of the construction will be completed without directives by the end of 1943.

This reduced program will permit production of approximately 241,000 long tons of synthetic rubber during all of 1943, and as a result, stocks of rubber in this country will be down to the absolute working minimum of 100,000 tons during December. After that, the rubber director anticipates a gradual improvement in the stock situation.

Aside from the warnings of a serious stock position next winter, the report was not pessimistic, and indicates that the United States probably can meet all essential military and civilian requirements for rubber or rubber substitutes.

Four Developments Responsible

Four developments, Mr. Jeffers explained in his report on rubber conditions existing as of February 1, were responsible for modifying certain phases of the program:

"1. The shortage of critical components (such as valves, heat exchangers, turbines, blowers, pumps, motors, etc.) is so great that the refinery conversions for "quick" butadiene production cannot be finished in anything like the time originally envisioned by the Baruch committee.

"2. It has been decided that other programs are of equal urgency with the rubber program, so that further delays must be expected in completing the last part of the rubber program.

"3. The expansion of the high-octane gasoline program makes it essential that everything possible be done to avoid unnecessary drains upon components, facilities, feed stocks and labor usuable by both programs.

"4. It has become evident that some of the large butadiene manufacturing units may ultimately run at more

TABLE 1—Present Butadiene Program
(United States only)

Basic process—From:	Capacities in terms of butadiene, short tons
Alcohol	220,000
Butane	75,000
Butene by dehydrogenation	265,100
Naphtha cracking (refinery conversion)	96,760
Total	656,860

TABLE 2—Present Synthetic Program Now Building, United States Only
(Long tons per year capacity)

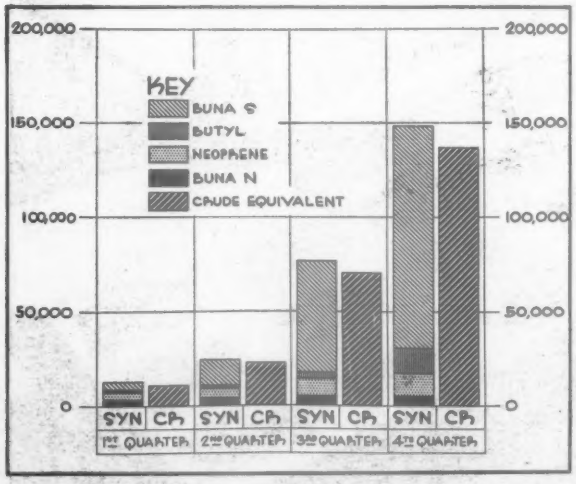
	Baruch committee recommendations	Now building (rated capacity)
Buna-S	845,000	705,000
Neoprene	60,000	40,000
Butyl	132,000	68,000
Total	1,037,000	813,000

TABLE 3—Plants Under Directives, United States Only*
(Long tons rated annual capacities)

	Baruch report recommendation	Now under directive*	% of total committee program
Buna-S	845,000	435,000	41.9
Butyl	132,000	7,000	.7
Neoprene	60,000	10,000	1.0
Total	1,037,000	452,000	43.6

*These include plants now built or presently finishing without directives.

Buna-S, the chart shows, has retained its position as the favored synthetic-rubber material in revised program



Here's how the growth of synthetic-rubber production is projected by Director Jeffers with figures in long tons

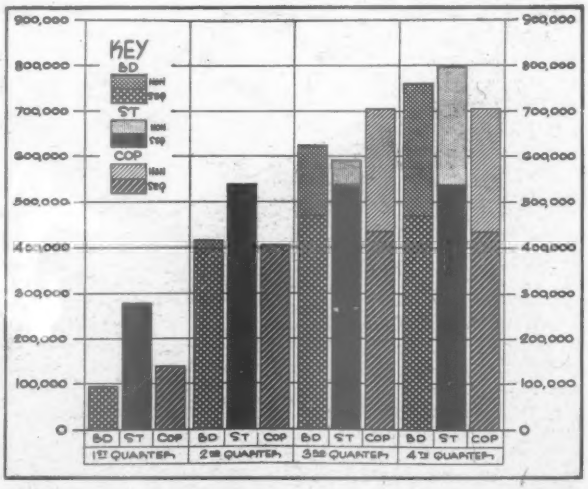


TABLE 4—Accumulated Rated Annual Capacities
(United States plants only. All quantities in long tons)

	Quarter— First	Second	Third	Fourth
Butadiene	94,600	415,600	622,800	761,900
Nonsequenced*	...	17,100	152,800	291,900
Sequenced†	94,600	398,500	470,000	470,000
Styrene	278,100	538,000	590,900	798,600
Nonsequenced*	.....	.....	52,900	260,600
Sequenced†	278,100	538,000	538,000	538,000
Copolymer	137,500	405,000	705,000	705,000
Nonsequenced*	.....	.....	270,000	270,000
Sequenced†	137,500	405,000	435,000	435,000

*Includes all other plants in present program now building.
†Includes completed plants and those marked urgent.

TABLE 5—Estimated 1943 Quarterly Production* of Synthetic Rubber, Showing Crude Equivalent for Buna-S, Butyl, Neoprene and Buna-N

(All quantities estimated in long tons)

	Quarter— First	Second	Third	Fourth	Year total
Buna-S	3,800	13,900	59,500	118,000	195,200
Butyl	100	1,500	3,300	13,500	18,400
Neoprene	4,400	4,900	9,100	12,000	30,400
Buna-N	2,900	3,900	4,800	4,800	16,400
Total synthetic	11,200	24,200	76,700	148,300	260,400
Crude equivalent	10,800	22,900	70,700	136,600	241,000

*Includes neoprene and buna-N capacities of private plants.

than their originally rated capacity. It is possible that by the end of 1943 the alcohol butadiene plants may produce 55,000 to 110,000 tons more butadiene a year than their rated capacity.

"Consequently," the report continues, "it has seemed advisable to cancel some of the more recently approved conversions which could not be expected to contribute much, if any, "quick" butadiene needed during the summer and early fall of 1943.

"Though no doubts now exist as to the workability of the Houdry process, transportation difficulties incident to the location of certain partly built plants and the difficulty of procuring certain units made it necessary to cancel the contemplated conversions at Wood River, Ill.; Beaumont, Tex., and some others.

Could Reduce Delay

"Even though experience should prove the canceling of these conversions to have been an unwise move, the demand for component parts should be so much less by early fall that other steps could then be taken which would not delay their share of the program for more than a month or two, and would still provide the butadiene needed in 1944.

"Table 1 shows the effect of these developments on the butadiene part of the program.

"The rated capacity of the plants now contemplated will produce enough butadiene to make 761,900 long tons of buna-S. Though the Baruch committee recommended providing enough butadiene for 845,000 tons of buna-S a year, it is not now planned to authorize any further plants except those to produce the recommended 30,000 tons a year from grain.

"Reductions have also been made in the neoprene and butyl programs. Neoprene has been reduced from the recommended 60,000 long tons to 40,000 and butyl from 132,000 long tons to 68,000. The reasons for these reductions are:

"1. There may be a sufficient excess of butadiene by the winter of 1944 to permit a replacement of these tonnages with buna-S.

"2. Further testing and experience have indicated to the military authorities that, except as a last recourse, neoprene and butyl will not be used for military tires.

"3. The need for isobutylene in the high-octane program is more urgent than its use in butyl rubber.

"Therefore, the present rubber program in terms of rated capacities is as shown in Table 2.

"Plants are now being built to make enough butadiene to produce 761,900 tons of buna-S, and enough styrene to produce 798,600 tons of buna-S.

"As of today (February 1) plants now sequenced and under directive, together with those finished or expected to be finished during the next few months, have total rated capacities of 452,000 tons of synthetic rubbers a year, or 43.6 per cent of the 1,037,000 tons recommended by the Baruch committee. (See Table 3.)

It should be noted that Table 3 shows only that portion of the program under directives and the plants which have been built or are about to be finished without such directives (43.6 per cent); whereas Table 2 shows the entire building program, including plants being erected with lower priority ratings.

Expected 1943 Production

As a result of the many delays that have beset the program, we now estimate that the expected capacity that will come into production during the various months of 1943 will produce only a total of 241,000 long tons (equivalent crude value) of synthetic rubber, instead of the 354,000 tons envisioned in Progress Report 1. This includes 3,000 tons from a Canadian plant.

Other Sources of Supply

"Approximately 440,000 tons of crude rubber were on hand in the United States and Canada on January 1, 1943. After estimating the quantities to be shipped to our Allies, and taking all of the other factors mentioned into consideration, it is expected that we can count on receiving, in terms of plantation crude, a new supply of 35,000 tons during 1943.

Requirements

"Present estimates of essential 1943 requirements to be filled by rubber from the United States and Canada are:

	Tons
U. S. military	312,500
Commercial vehicles	65,000
Sundry industrial, indirect military, and civilian	41,000
Canadian	47,500
Export (as finished goods)	105,000
British deficiency (buna-S)	41,290
Total	612,290

"The presently expected most critical period is from October 1943 to March 1944, with December the low point; thereafter supplies should exceed consumption."

Rubber Drive Receiving Stations to Close March 10

WASHINGTON, D. C.—Government storage locations for the scrap rubber collected in the petroleum industry scrap-rubber drive last summer will be closed by the Rubber Reserve Co. on March 10, because receipts indicate that practically every pound collected has now been shipped, William R. Boyd, Jr., chairman of the Petroleum Industry War Council, announced this week.

All oil companies who still have any rubber remaining from that drive should ship it at once, he said, and he also urged all participants in the drive to make a supreme effort to complete all bookkeeping at once, and to send final statements and checks to the council for deposit in its rubber-drive trust fund so that distribution of the excess money to the four national service organizations can be made without delay.

As soon as all shipments have been completed, and all accounts with Rubber Reserve Co. settled, a statement of the pounds of rubber purchased, the pounds of rubber sold to Rubber Reserve Co., and the amount of money represented by the difference between the cost of the rubber purchased at a penny a pound, and the amount received from Rubber Reserve Co., should be prepared and sent to the council with your check for this difference made payable to Petroleum Industry War Council, Trustee, President's Rubber Drive.

State Capitals

OKLAHOMA

MARKET-DEMAND hearing to determine the March production schedule for crude-oil and condensate fields has been set for February 26 at Oklahoma City, by the Corporation Commission. The commission will also receive nominations on that day from purchasers of natural gas from the West Cement field of Caddo County.

CONSERVATION Department attaches currently are engaged in assisting District 2 representatives of the Petroleum Administration for War in determining productive ability of all fields in the Middle West.

PAW is attempting to get the answers to these four questions:

1. What are the wells of the various states able to produce under existing conservation methods?
2. What could the wells do if the demand was increased 25 per cent?
3. How would the wells act if they were produced at rates 50 per cent above the current level?
4. How long would the wells last if an "all out" demand was made upon them to fill the petroleum requirements of this country and the United Nations?

PAW engineers and economists are noncommittal about their findings at this incomplete stage of the investigation but oil producers are growing more deeply concerned about restrictions on drilling and failure of discoveries to reflect a more favorable balance against current production.

A BILL HAS been introduced into the Oklahoma Legislature providing additional fees of $5 for the filing of all instruments on tracts of 80 acres or less and of $10 on all larger tracts. It further requires the refiling and rerecording on or before July 1, 1943, of all conveyances of oil and gas mineral rights and leases heretofore placed of record and stipulates that this same procedure must take place every 3 years thereafter or such instruments will expire and shall revert to the owner of fee simple. The bill was reported from the house committee on fees and salaries without recommendation and will probably be considered by the committee of the whole house in the near future.

Opposition has been expressed by independent operators, company officials as well as by royalty owners and dealers on the ground that the measure would cost lessees and royalty owners millions of dollars and accelerate the exodus of oil operators from the state.

ILLINOIS

THE ILLINOIS HOUSE committee on conservation of natural resources has voted to draft a joint senate-house resolution, asking the federal Government for a higher ceiling price on crude oil. The decision was reached following requests from Texas and Oklahoma that oil-producing states join in such a request. Testifying before the committee, I. G. Burrell, petroleum engineer of the Ohio Oil Co. drew attention to Illinois' declining reserves. He said that reserves had dropped during 1942 from 400,000,000 bbl. to 310,000,000 bbl. with production of 105,000,000 during the year. He also pointed out that no one is anxious to drill wells now because the average profit of 20 cents a well per day (which is the average for his company's 5,000 wells) is too small for the risks involved.

TEXAS

THE MARCH allowable order by the Texas Railroad Commission will not be issued until the commission receives a reply to its telegram to the Petroleum Administrator for War asking that it be left free to set the allowables for the state.

GOVERNOR STEVENSON signed the bill whereby Texas would participate in the interstate compact to conserve oil and gas.

REP. LESTER Q. EVANS, of Denison, has introduced a bill whereby a new tax of 2 cents per barrel on oil and one-fourth per cent per gallon on all condensates produced in Texas be imposed. Purpose of the new tax would be to raise additional funds for teachers, state employes, pensions, and establish a rehabilitation fund for soldiers returning from the war.

A SUIT BROUGHT by Konawa Oil Co. challenging the Railroad Commission's water-oil ratio order in the East Texas field was under advisement of Judge J. D. Moore, of the 98th District Court. Five weeks of testimony and argument had been admitted in the case.

A SUIT STYLED State of Texas vs. Ohio Oil Co. et al to determine whether vacancies exist in the Yates pool of Pecos County will be tried in the Court of Civil Appeals at Austin April 7. An instructed verdict was rendered in favor of Ohio Oil Co. et al May 20, 1942, which denied the existence of 70.06 acres of vacant school land in the field, and the state appealed the case. The state claims it was dispossessed of the lands January 2, 1935, and seeks to recover an annual rental of $10,000.

COLORADO

BILLS have been introduced in both branches of the legislature expanding the powers of the present Gas Conservation Commission to include oil operations, making the state oil inspector chief executive officer with an increase in pay not to exceed $100 per month and providing for an inspector at $150 a month.

Warwick M. Downing, chairman of the Gas Conservation Commission, presided at a meeting of oil men in Denver February 15 at which the proposed measure was discussed. The chief argument advanced in favor of the proposed law is that if the state does not enact some kind of a regulatory code the federal agencies will step in and take over.

The concensus of opinion was that the provisions of the measure are too strict. A committee of attorneys was appointed to recommend revisions, but it is doubtful whether anything will come of it. There is no strong sentiment in favor of regulation.

KANSAS

GOVERNOR SCHOEPPEL last week criticized sharply an OPA ruling denying gasoline to brokers dealing in oil-field leases and said that he would carry his protests to Washington, if necessary, to get the policy changed. He pointed out that brokers were essential in negotiating leases prior to wildcatting and that the OPA action would act as a brake on the wildcatting activities which the government is attempting to stimulate.

At Wichita, state OPA director H. O. Davis said that he was investigating the specific reports of oil lease brokers being denied gasoline to carry on their work. He said that under a national interpretation by OPA's Washington office preferred mileage may not be allowed for travel by lease brokers and promoters engaged in title work or initiating leases.

the OIL AND GAS JOURNAL

PRODUCTION - TRANSPORTATION
REFINING - NATURAL GASOLINE

Founded in 1910 by
PATRICK C. BOYLE

"Penny Wise, Pound Foolish"

THERE are certain tests which should be applied by operators as they discuss how far they should go in the pooling of their operating facilities as a war measure. There is danger in this program as in many other government proposals of being "penny wise and pound foolish" with unsatisfactory results for everyone concerned.

The first test, of course, is whether or not the consolidations will actually serve the Government's principal objective of conserving materials and manpower. No one will dispute the advisability of combining operations with fewer employes and a reduction in materials provided they continue to contribute in full to the petroleum industry's essential functions during a national emergency.

It is easy for bureau heads to direct a revision of our economy on a regimented basis which would eliminate all duplication of facilities. Some of this planning predates the war by several years. The trouble in application has been that in too many instances it has taken more manpower to conceive, apply, and police these schemes than is saved by the rearrangement. The alarming expansion of government payrolls attests to this.

Furthermore the new way of life has been greased with government gratuities whenever they have been considered expedient. Take a look at parts of the current federal budget and of the national debt if there is any doubt as to what these hand-outs mean. There are also plenty of cases in which production and service to consumers have suffered. None of this helps win a war.

Operators in all divisions of the oil business should insist on doing their own pooling. Its managers and technicians know better than anyone else what can be accomplished by dropping some operations for a time and expanding others with the view of assuring the maximum wartime efficiency. Complete studies of these matters will reveal that not all duplications should be eliminated.

It is conceded that in marketing, this industry has overdone the service end, a fault shared with many other industries and one which was being remedied by economic forces before Pearl Harbor. It doesn't follow under war conditions that three-fourths or more of all service stations and bulk stations should be closed. Consolidations should be checked against the fact that in 1943, despite rationing, the distributing branch will have to carry on at least 75 per cent of its peacetime operations.

The position of tens of thousands of independent jobbers and station operators, hundreds of their suppliers and millions of military and civilian users doing war work, have to be considered before further reductions in facilities are justified.

Finally, safeguards should be established to assure that any pooling arrangements can be unscrambled when the emergency is over. There are those among our political leadership who are hopeful that conditions will be such that the industrial regimentation of war will be continued as part and parcel of our postwar economy.

The accomplishments of this industry, including many of this war period, are those of a free competitive enterprise. As an A.I.M.E. speaker said last week, "there is always duplication of effort in competition of any sort whatsoever. It is this very process that paves the way for progress". Petroleum's operators must be in a position to resume full speed ahead when the restrictions of war are lifted.

Texas Operators Discuss Shortages, Pipe Lines and Spacing at Hearing

by Harry F. Simons

FORT WORTH, Tex.—The impending national shortage of crude oil, when it will occur, dislocation of crude supplies caused by operation of the War Emergency pipe line and resentment over the PAW action in telling the state from which fields to increase production, occupied the Texas Railroad Commission at its monthly state-wide hearing here February 18. Woven into the discussion was the situation of the West Texas operators who are suffering from low allowables owing to transportation shortages.

PAW raised its Texas production quota 50,000 bbl. for March to 1,502,000 bbl. daily, but specified the additional oil should come from Texas District 3 (Gulf Coast).

The commission also changed its spacing orders back to the original Rule 37 version which permits 20-acre drilling, issued a detailed report showing where there is a possibility of increased production and adopted a resolution from C. F. Roeser of Fort Worth calling for support of the 20-in. products line from the Gulf Coast to Seymour, Ind.

After considerable discussion on the topic, led principally by Amon G. Carter, Fort Worth, independent oil producer and publisher, Chairman Beauford Jester of the commission announced that the board was considering informing Deputy Administrator Ralph K. Davies that inquiry had failed to uncover who was asking a 50,000-bbl. increase in the upper Gulf Coast district and requesting that the Railroad Commission be permitted to allocate the state's production.

Mr. Carter had earlier wanted to know who had sought the 50,000-bbl. increase in Texas District 3, why it was sought and who granted it, particularly in view of curtailment in other areas in the state. (West Texas nominations were down 18,662 bbl., North Texas nominations dropped 9,484 bbl. and Panhandle dropped 2,000 bbl. along with decreases in other areas.)

Questioning of purchasers from District 3 revealed that they were asking 350,632 bbl. daily for March as against 339,761 bbl. per day in February, 39,129 bbl. per day under PAW's certification. Mr. Carter then asked if allowables of an area could be increased when there were no nominations and a majority of the commission indicated it couldn't.

Each of the District 3 purchasers explained the increases in nominations. Humble Oil & Refining Co. reported need for 2,600 bbl. additional light crude to supply PAW pipe line Project 1 and its own requirements. Others reported they were trying to replace crude taken by the WEP. One company (Gulf) said it was being forced to withdraw 12,000 bbl. daily from storage but hoped it could get additional crude. Crown Central Petroleum Corp. and Southwest Petroleum Co. were seeking oil although not caring where they got it so long as it fitted into the plant operational picture. Southwest Petroleum reported it had been forced to reduce approximately 50 per cent the 460,000 bbl. per month throughput of its 87-octane plant and that on March 1 it would go on stream with a 100-octane plant which would require approximately 600,000 bbl. per month.

Nixon Makes Protest

Clearest picture of the situation was given by Maston Nixon, Southern Minerals Corp., member of transportation committee for PAW District 3 and chairman of the subcommittee on crude-oil supply. Mr. Nixon emphasized that he was speaking as a private operator and not as a member of the committees.

C. J. Wrightsman and W. J. Ricker, Fort Worth independent operators, discuss a point at the Railroad Commission hearing

He pointed out that PAW reversed the flow of crude from Louisiana to the Gulf Coast district which was supplying approximately 60,000 bbl. per day less in December than in July of 1942. Another 50,000 to 60,000 bbl. of East Texas and Texas Gulf crudes were taken for the WEP 24-in. line which meant a total of 110,000 bbl. taken from the upper Gulf Coast refineries. To make matters worse, Mr. Nixon said 350,000 bbl. of daily tanker capacity has been pulled away from operators in this area and requirements of the WEP line are increasing.

On the other hand, Mr. Nixon pointed out, the area now has a war-refining capacity of 1,000,000 bbl. daily and by September 1 will have a capacity of 1,300,000 bbl. per day. This means that a large quantity of sweet crude will have to be brought to the Texas Gulf from Louisiana, Southwest Texas and other areas. By the second quarter of the year the demand for Southwest Texas crude for delivery in the upper Gulf Coast will be strong and by the third or fourth quarter "West Texas crude will not be so sour" and operators in that area may be asking for a reduction instead of an increase in the allowables.

Present WEP Status

Present status of the WEP was related by Mr. Nixon and J. A. Neath, a director of Humble Oil & Refining Co., under questioning by commissioners. On February 15, deliveries of 110,000 to 125,000 bbl. per day of crude oil were being made to Norris City, Ill., after 1,500,000 to 1,600,000 bbl. of oil was used to fill the line. This oil is being furnished by Humble, Gulf, Atlantic, Sun, Magnolia, Tide Water, Shell, Pure and Cities Service. No heating oil will be moved until the latter part of March due to the lack to tankage for batching shipments through the line.

This oil is purchased by WEP with the Defense Supply Corp. paying for it. After it gets to the East Coast, it is sold to refineries, the allocation there being by a committee. The basis for East Coast allocations is the maximum yield of war products.

It will be possible to move sour crude through the big line whenever sufficient tankage is available at terminals to permit batching with a minimum of contamination.

When asked whether there were many refineries on the East Coast capable of handling West Texas sour crude, Hines Baker, vice president of Humble, replied that some could and some could not and that the amount which could be handled at each plant varied. He added that at present 7,000 bbl. per day of sour crude was being shipped to Bayonne, N. J., from East Texas by tank car but this would be stopped March 1 by withdrawal of the cars.

Mr. Neath pointed out that Humble formerly sold about 65,000 bbl. per day of sour crude to eastern refineries and that when shipments could be resumed this amount of sour oil again could be processed provided the PAW Refining Division would grant permission. (The objective in recent months has been to recover maximum yield of war materials, such as high-octane, toluene and butadiene, as possible from a minimum of crude oil transported and processed. This necessitates selective processing which in turn forces purchasers to obtain crude from selected areas. The yield of vital war products from sour crude is lower than from aromatic oils.)

There was no doubt that PAW's action in specifying that the 50,000 bbl. increase in the state's allowable should come from the Gulf Coast district caused considerable resentment. Chairman Jester said that the commission had requested an increase of 140,000 bbl. per day. Nominations for March were 1,594,177 bbl. per day, while the February allowable is 1,427,821 bbl.

Nonintervention Pledged

Col. E. O. Thompson, commissioner, pointed out that PAW had previously assured the Railroad Commission that it would simply set the state quota and would not attempt to dictate where the oil should be produced, designating only the type and amount of crude needed. Commissioner Olin Culberson stated he had previously wired Mr. Davies that there was an impending shortage of aromatic crudes and refiners should start immediately to use some sour oil. Whether the commission would or would not accept the PAW order giving all of the state's increase to the Gulf Coast remains undetermined.

Barnsdall Oil Co. asked 1,800 bbl. additional crude in District 2, particularly in the McFaddin field, with some coming from Fagan and Keeran. This oil will be handled by reversing the pipe line into Corpus Christi and shipping from McFaddin to Placedo and then to the Beaumont refinery of Magnolia Petroleum Co.

Republic Oil & Refining Co. asked removal of shut-down days in the Heyser pool so as to supply 2,500 bbl. additional oil daily to its Texas City refinery. An increase of 60 bbl. was sought in the Rooke field. Crown Central asked for 3,000 bbl. of Hastings crude in order to change over from 87 to 91-octane manufacture.

E. O. Thompson, railroad commissioner, explains a regulation to E. H. Foster and W. B. Hamilton, both of Amarillo, Tex., representing Phillips Petroleum Co. at last week's hearing

Pan American sought increases in Hastings and South Houston to make up a 7,000-bbl. deficiency in toluene-producing crudes needed to meet its 45,000-bbl. per day runs to stills. Ohio Oil Co. requested a boost in the North Markham field allowable.

Southern Minerals announced it would enter the Luby, Plymouth and Taft fields in Texas District 4 for around 3,000 bbl. per day. This oil is to go to Taylor Refining Co. and the Eastern States Petroleum Co., Houston. Eastern States will start butadiene manufacture in March. (Luby crude gives 26 per cent 87-octane gasoline with 4 cc. lead.)

Sinclair Prairie Oil Marketing Co. asked that its runs in the Southwest Texas district be placed at 16,000 bbl. daily during March but representatives said it would seek an increase to 22,645 bbl. in April. Tanks are now being erected on the Corpus Christi-to-Houston line and in addition work is being done on loops from Huffman to Houston. Paul McDermott, representing the Sinclair company, stated that he wished he could see where storage oil could be obtained and that at present withdrawals of sweet oil were running between 8,000 and 9,000 bbl. per day. Mr. McDermott also pointed out that his company was reducing nominations in other areas because the oil could not be obtained. In North Texas the nominations were 30,900 bbl. and the company would take gladly 40,000 bbl. if the connections would yield it.

The commission received a request to reduce the allowable in the Wade City-McNeil sand pool from 950 to around 750 bbl. per month with the total taken over a 31-day period. This will permit operators to make a bottom-hole-pressure and a water-encroachment study. The field yields high-octane crude and operators are fearful of damaging the reservoir. The request was made by Gaylord Chizum representing Rodney DeLange, operator in the pool.

Pure Oil Co. asked an 8,000-bbl. per day increase in the Van pool to make up for oil lost to the WEP. This crude is needed for Pure's refinery between Beaumont and Port Arthur, Tex.

Phillips Petroleum Co. asked 27 operating days in the Panhandle in order to supply its Borger plant, now running 43,000 bbl. daily, and still maintain its working storage.

East Texas Pressure Up

The East Texas field was responding to the water-curtailment program according to figures available to the commission. Average bottom-hole pressure increased 4.84 lb. per sq. in. from 1,015.71 on January 1 to 1,020.54 lb. on February 1. Allowable during the period was 328,184 bbl. per day and 10,173,704 bbl. for the month.

A motion by Commissioner Culberson changed the spacing rule in the state back to the 20-acre regulation prevailing before the federal 40-acre ruling. The change will eliminate hearings on exceptions from Rule 37 in many instances and will permit 20-acre spots on 40-acre locations. PAW issues clearance for materials to be used in wells that are 330 ft. from the nearest property line and 660 ft. from the nearest well spudded before December 23, 1941, and 990 ft. from the nearest well spudded after that date.

Texas Railroad Commission Report Shows Possible Increment of 1,339,865 Bbl.

FORT WORTH, Tex.—Over a month ago the Texas Railroad Commission requested operators to indicate how much additional crude oil could be produced from the fields in the state. This was done in order to determine whether a shortage of crude oil existed and where additional oil could be obtained as the demand increased due to the War Emergency pipe line and other carriers going into operation.

Result of the survey was released last week when the Railroad Commission issued a voluminous report showing the estimates of operators in the various fields. Unfortunately, all operators did not report their opinions and in some fields the data is rather sketchy. However, enough operators supplied data for a fairly comprehensive picture to be drawn. At least it is the most complete information of its type ever assembled and has considerable strength because it represents a cross-section of Texas' oil industry.

Data contained in the report, plus information from the Railroad Commission's December production report are given in Table 1. It will be noted that the fields reporting as being capable of sustaining an increase, represent 77.1 per cent of the total sourse of petroleum in the state. It is possible that some of the unreported fields might be capable of some in-

TABLE 1

District	Wells flowing 12-1-43	Wells pumping 12-1-43	Dec. daily allowable for district	Dec. daily allowable for fields reported	Possible increase bbl./day 1943	Possible increase bbl./day 1944	Maximum possible increase reported
1	71	3,480	20,836	7,323	2,126	2,626	4,226
2	2,115	625	97,085	89,472	64,582	54,227	135,966
3	5,351	2,775	295,659	206,747	193,238	191,025	217,038
4	2,736	5,286	110,870	67,142	75,421	71,073	113,278
5	346	1,409	19,355	10,166	30,290	30,290	30,290
6	17,656	9,766	447,334	405,271	90,556	104,289	245,816
7-B	425	6,458	28,336	7,659	4,369	4,324	5,465
7-C	86	1,192	19,434	13,172	5,892	6,016	11,890
8	7,742	6,098	201,723	178,551	225,396	206,162	486,391
9	1,871	17,693	131,436	59,192	16,133	10,240	37,505
10	38	5,538	104,432	104,432	8,000	6,000	52,000
Total	38,437	60,320	1,476,500	1,149,127	716.093	686,272	1,339,865

TABLE 2

Fields in Which Substantial Increases May Be Made in Production

	Dec. 1942 allowable per day	Possible increase in production, bbl./day 1943	1944	Maximum
District 1				
Darst Creek	6,729	1,200	1,700	3,300
District 2				
Greta	1,049	8,480	7,100	14,500
La Rosa	1,127	2,898	2,642	3,373
Lolita	5,408	4,147	3,522	12,500
Maurbro	1,054	2,900	2,900	2,900
McFadden	3,454	2,896	2,116	3,300
Refugio, New (deep)	....	3,500	1,750	3,500
Tom O'Connor	36,689	10,000	10,000	52,750
West Ranch	16,066	14,956	12,622	25,000
District 3				
Anahuac	7,935	21,909	21,076	27,786
Clear Lake	1,990	4,010	4,010	4,010
Conroe	48,726	15,166	15,166	17,000
Fairbanks	7,000	3,000	3,000	7,000
Fannett	1,468	3,838	2,838	3,838
Hastings	40,349	19,600	19,600	19,651
Markham, North, (Cor. sand)	310	4,313	4,313	4,313
Old Ocean	9,955	5,045	5,045	5,045
Raccoon Bend	3,780	5,220	5,220	5,220
South Houston	2,194	3,806	3,806	3,806
Sugarland	1,999	9,705	9,705	9,705
Thompson	14,120	16,500	16,500	18,597
Webster	11,027	48,973	48,973	48,973
Withers, North	....	7,500	7,500	7,500
District 4				
Aransas Pass	697	4,150	3,800	5,300
Ben Bolt	482	3,510	3,510	6,300
Colorado	476	2,812	2,812	4,600
Hoffman	3,505	7,750	5,780	12,800
Luby	1,104	2,924	2,924	3,400
Rincon	6,600	2,984	2,984	5,700
Seeligson	481	11,445	11,445	19,534
Stratton	2,055	6,620	6,620	7,424
District 5				
Van	9,902	30,090	30,090	30,090
District 6				
East Texas	362,161	65,880	79,613	218,126
Coke	1,249	3,050	3,050	3,190
Hawkins	28,279	20,126	20,126	23,000
District 7-B				
Noodle Creek, So.	149	900	900	900
District 7-C				
McCamey	10,174	1,700	1,700	5,275
Noelke	224	1,300	1,300	1,300
Todd Deep	248	2,012	2,012	3,775
Barnhardt	497	330	740	740
District 8				
Cowden, North	5,180	18,400	16,000	40,000
Goldsmith	15,195	12,605	11,611	35,000
Henderson	4,407	7,620	6,900	21,000
McElroy	15,560	9,016	8,516	29,440
Seminole	4,056	16,949	16,949	30,660
Slaughter	20,699	35,835	32,907	68,033
Wasson	22,005	46,075	41,925	118,058
Yates	22,011	14,500	14,000	27,989
District 9				
Hull-Silk	11,354	5,132	4,601	11,354
K.M.A. (Ellen.)	8,900	9,150	4,575	17,800
District 10				
Panhandle	104,432	8,000	6,000	52,000

crease in output but the total additional oil represented is probably small. This is further borne out by examination of the table which reveals that most of the fields not reported are in the pumping or settled production stage.

The figures given by the operators represent what in their opinion the fields could produce without waste and harm to the reservoirs. In perhaps the majority of cases, a production considerably over the figures given could be obtained for a short time in case a dire emergency existed. However, such high withdrawals would lessen the ultimate recovery and eventually would hurt rather than help the nation's oil economy.

The figures listed under "production increase" were obtained by averaging the estimates of the various operators in the pool. Where only one operator gave his opinion, his was the guiding light. The estimates of pools in which a large number of operators reported are probably sounder than those in which only one company's figures are used. The last column in the table gives the maximum increase reported for each field and the total shows that the daily output taking the most optimistic figures could only be increased 90 per cent over the present levels.

Coast Fields in Spotlight

District 3 (Gulf Coast) is a present in the limelight due to PAW's certification specifying that the 50,000 bbl. increase in Texas production during March must come from this area.

Largest available source of crude oil is in District 8, West Texas. It is one of the two areas in which production can be more than doubled according to the estimates and if the maximum figures are taken, production in West Texas could reach 687,000 bbl. daily. The average figure for 1943 of a top production of 427,000 bbl. per day is probably attainable.

The other area which shows a substantial percentage increase (nearly 300 per cent) is District 5, East Central Texas.

District 6, which includes the East Texas field, is one of the areas where a wide range of opinions prevailed. The maximum increase shown might be obtainable. Several operators said no increase in withdrawals from East Texas could be made while several placed the possible increase above 200,000 bbl. Practically all emphasized that no increase could be made in withdrawals unless the salt water produced was returned to the Woodbine sand. The increase in water injection accounts for the fact that the estimate for 1944 production in the pool is greater than for 1943.

Table 2 shows the principal sources of supply in the various districts which may eventually be called on to meet the nation's oil demand.

Federal Order Digest

Price Administration

Asphalt — MPR 323: Clarifies and simplifies ceilings applicable to all grades of asphalt at all points and on all types of sales; removes asphalt and asphalt products from RPS 88, effective February 20.

Industrial Lubricants — RPS 88, Amendment 69: Extends price formulas to cover combinations of new ingredients, to reflect more accurately current market conditions, effective February 25.

Fuel Oils—RPS 88, Amendment 72: Replaces temporary fuel-oil prices in the lower Michigan Peninsula by adjusted ceilings for kerosene, range oil, prime white distillate and Nos. 1, 2 and 3 fuel oil at both tank-wagon and retail levels, effective February 22.

Fuel Oils (retail) — MPR 137, Amendment 22: Authorizes 0.3 cent per gallon advance on light fuels and kerosene in 30 states and District of Columbia, in eastern and middle part of country, effective February 22.

Crude Oil — RPS 88, Amendment 76: Removes oil handled in 24-in. emergency line from ceilings at eastern terminus sales by DSC, effective February 19.

Crude Oil—GMPR, SR 1, Amendment 53: Withdraws price ceiling from DSC sales of crude and products at eastern terminus of WEP, effective February 19.

Fuel, Heating Oils — MPR 165, amended, SSR 7: Permits dealers selling fuel oil and heating oils on commission from tank wagons to increase commission charges 0.3 cent per gallon in 30-state eastern, southern and Midwest rationing area, without effecting retail prices, effective February 24.

Rubber—MPR 107, Amendment 9: Withdraws minimum-quality specifications for used tires and tubes repaired in accordance with written permission of rubber director, effective February 24.

Services — GMPR, Amendment 43: Permits manufacturers and chain wholesalers to consider their separate establishments which are under a central pricing office as parts of one selling unit, effective February 18.

Services—GMPR 165, amended: Digests interpretations of provisions covering services in the general regulation.

OPA Rationing Orders

Gasoline — RO 5c, Amendment 23: Provides for additional mileage to enable car owners to drive to and from work if they can show they cannot get to their jobs any other way, effective February 24.

Tires—RO 1a, Amendment 12: Removes rationing restrictions on recapping passenger car and light-truck tires with camelback, effective February 20.

WPB Priority Orders

General Priorities—PR 16, Amendment to Schedule A: Adds 38 WPR orders to list of those which may be appealed only through WPB field offices; eight others previously on the list removed, effective February 22.

Gasoline—Supplementary Directive 1-Q: Redefines gasoline in delegation of authority to ration consumption by OPA, eliminating certain exempt fuels having military significance or in borderline classification, effective February 15.

Tank Trailers — L-253: Expedites manufacture of 800 oil tank trailers authorized under L-1-g, by prohibiting manufacture of most other types of truck bodies and brings all under rigid control, effective February 10.

Portland Cement — GLO L-179, amended: Strikes clause in previous order prohibiting manufacturers from assigning storage bins for exclusive use by individual customers, broadens testing provisions, effective February 16.

Supplies—PR 3, amended: Brings definitions into conformity with those in Controlled Materials Plan Regulation 5, effective February 16.

Aluminum Chloride — GPO M-287: Directs flow of anhydrous aluminum chloride to consumers directly involved in production of war materials such as aviation gasoline, synthetic rubber and toluene, effective March 15.

Silica Gel — GPO M-219: Revokes entire order, effective February 20.

Information Service — WPB establishes Telephone Inquiry Service, Room 1501, Social Security Building, central telephone number Republic 7500, extension 73011, for answering questions of war production problems or for reference to proper WPB officials.

Defense Transportation

Speed Regulations—Exemption Order 23-2; ODT 3, Revised 7; 6-10 and 17-20. Permits motor carriers engaged in making emergency deliveries for military and maritime services to exceed 35 m.p.h., provided vehicles carry certificate of exemption and display emergency-service pennants, effective March 1.

Inland Waterways—SO ODT W-2: Authorizes five large barge operators to "tow barges or other craft for one another," thus spreading available motive power, effective February 15.

WEP Dedicated as First Train of Crude Oil Leaves Norris City

NORRIS CITY, Ill.—Upwards of 50,000 bbl. of crude oil daily last week started moving through the loading rack and terminal here of the first 530-mile section of the War Emergency pipe line. Loadings here will increase to an eventual 250,000 bbl. daily and an additional 50,000 bbl. will reach the East Coast through connecting lines and other transshipping facilities in Illinois.

Brief ceremonies and a radio broadcast, in which Petroleum Administrator Ickes participated from Washington, marked the formal start of operations on the Texas-Illinois section of the line. Deputy Petroleum Administrator Ralph K. Davies, W. Alton Jones, president, and B. E. Hull, vice president and general manager of WEP were in Norris City to see the first trainload of crude dispatched to an eastern refinery.

Meanwhile, construction crews started work in the mountainous region near Chambersburg, Pa., on another of the 20 working spreads into which the 857-mile eastern extension of the 24-in. has been divided. Full scale construction work is now under way along more than 200 miles of the eastern Pennsylvania and western New Jersey route of the extension and the project is scheduled for completion in June.

In dedicating the 24-in., Petroleum Administrator Ickes said:

"Completion of this great war project in just 200 days from the date that construction was commenced is an engineering achievement of monumental proportions. Strong, intelligent men—the world's best pipeliners—have worked long hours through the biting cold of winter and against odds that at times taxed both strength and ingenuity to get the job done and to get it done on time. They were spurred in their work, I am confident, by the knowledge that they, too, no less than the men in uniform, were soldiers in the fight for freedom.

"In the words of the great Russian leader, Joseph Stalin, this is a war of engines and of octanes—a war of engines that will be fueled for the offensives to come with the 100 octane aviation gasoline, the high test motor fuel that will be manufactured from the Texas crude oil that now pours in a never-failing stream from the Norris City end of the War Emergency pipe line. From that same crude oil will be derived lubricants to make smooth the swiftly running engines.

"It is most appropriate, therefore, on this nineteenth day of February, that we pause for a moment to dedicate this great undertaking to the service for which it was built—the forging of another link in the victory chain with which we shall, sooner or later, hold Hitler securely.

"To the strong men, without whose loyal and patriotic services the line could not have been built, I say: You have your country's congratulations for a job well done!"

Refiners Split on Pipe Line

(Continued from Page 38)

report was submitted and the Senate resolution introduced.

On recommendation of the PAW, the War Production Board has approved the allocation of steel for the Texas-Indiana line, and PAW is making a study on which it probably will base a recommendation that construction be continued to the New York area. Meanwhile Secretary of Commerce Jesse Jones announced that the Defense Plant Corp. is prepared to finance the line on the same basis that it built the 24-in. WEP line to Norris City, Ill. He estimated that the 836 miles of line would cost $44,000,000 and would be completed by September 1, with a capacity of 250,000 bbl. of gasoline and light products per day. It is planned to start with a 16-in. line from Baytown, Tex., to Beaumont, with a 20-in. line to Little Rock, Ark., and from there via the route of the 24-in. line to Seymour. Feeder lines are planned to the principal refineries in the Beaumont-Port Arthur and the Houston-Texas City areas.

Appearing at the Truman committee hearing were C. R. Musgrave, vice president of the Phillips company and director of the District 2 supply and distribution committee and B. L. Majewski, chairman of the District 2 marketing committee. They asserted that refinery operations in District 2 are hampered by accumulated stocks of gasoline which cannot be moved, and that the Texas-Indiana line would not help this area. They argued that if the eastern end of the line were built this summer from Illinois or Indiana to New York it could be filled with refined products from Midwest and Mid-Continent refineries by means of tank cars, barges, and pipe-line connections via Wood River, Ill. They said this would provide the East with 27,000 bbl. per day more than the present plan because the same tank cars would have a shorter haul from Mid-Continent refineries to Seymour than from Seymour East.

While claiming to be willing to reconsider their decision, Ickes and Parten defended the present plan and opposed the alternative before the Truman committee. Administrator Ickes said he was concerned over postwar operation of the line and hoped to avoid monopolistic conditions or a change in competitive relationships, but that his present job is to provide petroleum facilities to win the war and the 20-in. line was planned as a war facility. Major Parten pointed out that production in District 2 has fallen 12,000 bbl. daily, and declared that while there is a surplus of gasoline in the area now it will be moved during the summer to supply increasing military demands in the area and for export to Canada. He said that by next year District 2 refiners may have difficulty in meeting these demands and would not be able to supply much oil for the East.

Both PAW officials indicated that they contemplate early construction of the line from Texas to New York, and that the controversy over which end should be built first is not of vital importance. They said they doubted that the southwestern railroads could handle the volume of tank-car shipments to Seymour as efficiently as the eastern roads.

Michael Straus Nominated For High Interior Post

WASHINGTON, D. C.—Michael W. Straus, formerly director of information for the Department of the Interior, director of the War Resources Council and a member of the legislative committee, last week was nominated for the office of first assistant Secretary of the Interior.

He served as a deck officer in the U. S. Navy during World War I and then entered newspaper work at Chicago and New York. Soon after entering government service June 16, 1933, he became director of information of the Federal Public Works Administration, later joining the Department of the Interior. After Pearl Harbor, he accepted temporary assignment with the War Production Board and served as chief of WPB Drive headquarters until some 1,600 labor-management committees were formed.

Nomination of Mr. Straus followed resignation of E. K. Burlew who has completed 33 years of government service.

Net Increase of 31,500 Bbl. Assigned Producers in March

WASHINGTON, D. C. — Petroleum Administrator for War Harold L. Ickes announced last week that a production rate of 4,193,800 bbl. daily of all petroleum liquids has been certified to the various petroleum-producing states for March 1943. This figure represents a net increase of 31,500 bbl. a day over the total production rate certified for February.

The rates of production certified to the Midwest and Rocky Mountain states (Districts 2 and 4, respectively) were generally reduced to conform with the continued declining productive capacity in those areas.

No changes from the February certifications were made in any of the other petroleum-producing states, with the exception of Texas in District 3, where a 50,000-bbl. increase was certified.

Explaining the increased rate for Texas, Deputy Petroleum Administrator Ralph K. Davies said: "Operation of the recently completed section of the War Emergency pipe line requires that an additional 50,000 bbl. daily of crude oil be made available from sweet-crude oil fields that are tributary to the Longview terminal of the line in East Texas.

"Transportation of this additional production through available tributary pipe lines becomes the important factor in view of the necessary shifting of tank cars to handle crude-oil movements from the Illinois terminal of the War Emergency pipe line to the eastern seaboard."

Following are the certified daily rates of production from each state during March as compared with certified rates in February 1943 and actual production in March 1942:

Certified Production Rates, Total Petroleum Liquids
(Barrels per day)

	Mar. '43	Feb. '43	Actual Mar. '42
District 1:			
New York	15,400	15,400	14,600
Pennsylvania	50,700	50,700	50,300
W. Virginia	19,400	19,400	16,300
Total	85,500	85,500	81,200
District 2:			
Illinois	282,300	272,200	330,800
Indiana	16,500	17,200	19,500
Kansas	309,900	310,500	249,000
Kentucky	19,400	19,000	12,700
Michigan	63,700	63,700	49,400
Nebraska	2,800	3,000	3,900
Ohio	10,100	10,100	10,100
Oklahoma	390,700	395,300	430,000
Total	1,075,400	1,091,000	1,105,400
District 3:			
Arkansas	78,700	78,700	77,000
Louisiana	349,800	348,800	345,200
Mississippi	50,000	50,000	87,300
New Mexico	105,800	105,800	88,000
Texas	1,502,000	1,452,000	1,370,900
Total	2,086,300	2,036,300	1,968,400
District 4:			
Colorado	7,000	7,000	5,400
Montana	23,400	24,700	21,900
Wyoming	92,500	94,100	90,300
Total	122,900	125,800	117,600
District 5:			
California	823,700	823,700	646,300
Others	.....	.....	200
Total U. S.	4,193,800	4,162,300	3,919,100

Sinclair Criticizes Industry's Delay

NEW YORK. — Failure to proceed more rapidly with the joint use of facilities was alleged here last week by Harry F. Sinclair, president of Consolidated Oil Corp., who criticized the industry at large for the delay and called for prompt remedial action.

For months, Mr. Sinclair declared, industry committees have been talking about pooling facilities, joint use of bulk stations, closing of service stations, and elimination of unnecessary tank-truck hauling. Surveys are being made in many sections to find out what can and should be done to effect economies in these respects. Meanwhile the waste incident to the oil marketing business-as-usual goes merrily on.

As an example of what can be accomplished, Mr. Sinclair cited the case of a community of 85,000 people where an industry made investigation disclosed that 13 out of 16 bulk plants could be closed releasing 40 out of 74 employes. Nine of 37 tank trucks now being operated in this city could do all the required hauling. The proposals as to service stations contemplated at least temporary abandonment of 187 retail outlets out of a total of 315, releasing 103 employes. "How," Mr. Sinclair asked, "can one justify the use in these times of 37 tank trucks for service that 9 could perform, or the maintenance of 315 retail outlets, when 128 would suffice."

"When we come to closing service stations," Mr. Sinclair says, "the little fellow and the independent must and should be considered. It is quite likely certain in my opinion that there are plenty of palatial major company stations that can and should be closed. The proper yardstick is what stations are essential from the viewpoint of location and otherwise for convenient and adequate service to the public."

Concluding his statement, which was sent to executives and leaders throughout the industry, members of Congress, and Washington officials, Mr. Sinclair said: "There is a credit as well as a debit side of the picture here presented. I do not pretend to know what conditions will be after the war. I do believe that wasteful practices will not be tolerated for two reasons. We have had our eyes opened and we will not be able to afford it. More than one industry will be under compulsion to reform its distribution methods. It is a matter of common knowledge that American industry, supreme in production, has been fantastically extravagant in marketing, which is just another word for distribution. Perhaps under the compulsion of war times, the oil industry will effect economies in its marketing operations and continue them after the war is over. Furthermore, steps in this direction which would in ordinary times be glaring combinations in restraint of trade can now be taken, as Administrator Davies points out, not only without fear of the Department of Justice, but with its blessing."

Labor Department May Rule Travel Expense Wages

Drilling contractors who are paying a special travel expense or travel allowance to crewmen may be required to regard such extra compensation as "wages," according to a revised opinion of the Dallas, Tex., office of the Department of Labor. This latest opinion, as reported in a bulletin of the American Association of Oilwell Drilling Contractors, was in answer to a question from the association concerning the status of a contractor paying various types of travel expenses. The question asked the department was:

"Where a drilling contractor voluntarily pays an employe $1 per day for travel allowance, as a means of repaying the employe for the use of his car, or for covering the approximate cost of going to and from the job in any other manner, is such payment in conflict with provisions of either the Wage and Hour Act or Executive Order 9250?"

The Department replied that such a payment probably would be considered wages. It was pointed out that the assumption of travel expenses by the employer might be regarded as a wage increase under Executive Order 9250, or that it might be considered as hours worked.

The Petroleum Engineer and the Developing Politico-Economic Situation

by John D. Gill *

AS we approach the end of military war, increasingly we need to consider the lessons from current and recent experience for postwar application. With such foresight as we can muster, we conclude that the obvious, tangible impacts of the war stack up insignificantly against the imposition upon us of the vast powers of certain new agencies of the executive branch of the Government.

What makes the matter worthy of our best reasoned consideration is the possibility that what we think and do about it may have a bearing upon the longevity and extent of such controls.

Now the postwar difficulty which confronts us grows out of the apparent belief of the agencies that the vast increase in production was creditable to their efforts in directing the course of producers. They ignore the overpowering influence of initiative and contract terms. So, the basis for a new concept is assumed. It is this concept which demands earnest and fearful consideration. The idea that government agencies controlling economic affairs can make industry more efficient than industry would be without their guidance and control is predicated, I believe, upon four conditions:

First, the enormous increase in production of certain wartime goods, whereby all national industrial production records have been eclipsed.

Second, favorable experience in a single type of control.

Third, inadequate consideration of the way in which the economic system operates.

Fourth, the lack of recognition of the social value of the freedom which permits many individuals, each in his own way, to engage in an economic endeavor of his choosing, even though his efforts parallel those of others.

There is another reason why it is appropriate for engineers to consider the subject of this paper. A politico-economic situation is created in government bureaus whose personnel is educated largely at the hands of industry's engineers. Nevertheless, through the education of the former by the latter, the staff of the government agency tends to get into a frame of mind that it knows better how to solve current technical and economic problems and better how to prepare for the future than the industry personnel from which it received its education. Indeed, growing out of our recent experience, one finds a basis for the idea that a government agency, as a result of this very educational process, finally grows so strong in knowledge and self-confidence of its ability, that it no longer hesitates to exercise its independent will and to oppose the collective judgment of the most experienced representatives of an entire industry. Sometimes it does this in questionable ways. On this point I would like to give you a current illustration.

*Atlantic Refining Co.

OPA's Action Arbitrary

For many months the oil industry has been considering the means for stimulating the search for crude oil. It was generally known that a report on this subject was to be made to the PIWC at its meeting during the first week of February of this year. It may have been assumed by the government agency which administers the price-control law that the report would contain some recommendation for a crude-price increase as the best means of stimulating the search for oil. In any event, 2 days before the industry's crude-oil report was submitted, on February 1, to be specific, the price-control agency released to the press of the nation a statement to the effect "that a general advance in crude-oil prices for the nation's oil production is not justified at this time." This categorical statement was predicated upon a survey of crude petroleum prices and costs which had been made by another government bureau. The study was purely historical in nature. It was void of opinion regarding the appropriateness of existing prices. It provided no information on up-to-date or current costs nor any forecast of near-term future, that is, replacement costs. Nor was there any evident consideration of the fact by the price-control agency that the most recent periods covered by the report were characterized by an alarmingly rapid decline in the rate of discovery of new crude reserves. On the other hand, the facts necessary to the formulation of a sound opinion on the subject were contained in the report submitted to the PIWC. This report would have been available to the price-control agency not later than 3 or 4 days after the press release to which I have referred.

Can any other conclusion be drawn than that the described action represents a procedural attitude of the agency? The critical nature of the crude-oil situation has been stressed repeatedly by other governmental agency spokesmen. It is a matter vitally affecting the country's interest. Does the press release mean that the issuing agency has grown so self-confident of the correctness of its opinion, despite the very evident lack of information on which to formulate an opinion, that it need no longer hesitate to exercise its will to oppose the collective judgment of the most representative and experienced personnel of the entire industry? Clearly this action is expressive of an attitude—an attitude which augurs not too well for the American economy if the powers of such agencies are continued into the postwar period.

These four abstracts of economic papers and one of a technical paper starting on page 64 of this issue complete coverage of the annual A.I.M.E., Petroleum Division, meeting last week in New York. Most papers were abstracted in 13 pages devoted to the meeting in the February 18 issue, starting on page 32.

The Economic Position of Natural Gas

by Veleair C. Smith

THE natural-gas industry ranks third in order of the carbon compounds, generally used in the production of energy. These are simply different states of matter which can be substituted one for the other. This substitution or interchangeability is the dominant factor controlling prices and markets.

Coal reserves are approximately 160 times that of oil and gas, they are, with respect to markets, strategically located. As a result we may expect to see motor fuel from coal replacing petroleum products and by-product gas from coke oven plants at the mines, transported in natural-gas transmission and distribution lines in the East.

Natural-gas reserves consistently increased in the period from the late twenties up to the moratorium in December 1941. Unfortunately for the war effort, a large part of these reserves were developed in areas far

distant from market and without adequate pipe-line facilities. The necessity of this gas seeking new markets in part accounts for an average price for the United States, as a whole, of 4.9 cents per 1,000 cu. ft. This is roughly equivalent on an emergency basis to coal at $1.25 per ton at the tipple and oil at 30 cents per barrel on the leases, or in effect making natural gas the cheapest fuel, as a raw material utilized by the chemical industry.

Unfortunately for the war effort, as well as the gas industry, the small contractor, producer and operator has largely been eliminated by a system strictly tailored for large-company operations. This has eliminated our most successful wildcatter, a master of the effective utilization of second-hand and junked materials and a gambler who produces about 50 per cent of our production and has been responsible for 75 to 85 per cent of the initial discovery wells in new fields.

Petroleum Exploration and Development in Wartime

by E. DeGolyer *

WE ARE not finding oil fast enough and we have not found oil fast enough for the past 4 years to replace that which we have produced and consumed and so to maintain our reserves on balance. Now war changes our values and our standards. We are moved by the stern need to increase our daily productive capacity and the discovery of new pools is the quickest and most effective way of achieving such results at a minimum expenditure of manpower and scarce and critical material.

Analyses of the poor results which have attended our exploratory efforts over the past 4 years, probable causes, and urgent request to increase the exploratory effort have been directed repeatedly to the oil industry by the Petroleum Administration for War. These warnings have been received by the industry with an understandable passiveness. During the entire period we have had and still have an excess capacity to produce. The transportation problems will have to be solved in order that we can avail ourselves of our full productive capacity but even then, if estimates are at all correct, we will need more oil than we are able to produce.

Let us look at the basic problem—that of exploration. In terms of effort, as measured by the number of wildcat wells drilled and by the number of geophysical and core-drill crews in operation, and these are perfectly satisfactory indexes, it is at an all-time peak.

Results of this effort, however, are below our hopes and below our necessities. The results of exploratory drilling 1934-42 are set forth in Table 1.

Our real problem is probably that of the tremendous rate of consumption of crude oil and products at which we arrived. There is nothing in the past history of our efforts at exploration for new fields to justify the belief that we can continue to discover indefinitely the almost one and a half billion barrels which we consume annually.

The PAW has recommended the drilling of 4,500 wildcats during the present year in comparison with the 3,045 drilled during 1942. The individual companies are being approached and asked to discuss their prospects and their proposed exploratory programs and every effort will be made to step up our rate of oil finding. The war has placed only one requirement on those engaged in petroleum explorations and development—to find more and more oil—of the right type and in available places—with less and less equipment.

*Assistant Deputy Oil Administrator.

TABLE I—Results of Exploratory Drilling

Year—	Total Wildcats Wells Drilled	Successful Wildcats	Number of New Fields Discovered	Total New Reserves Million Bbl.	Discovered Per Field Million Bbl.
1934	....	...	86	1,699	19.7
1935	....	...	104	1,934	18.6
1936	....	...	104	1,894	18.2
1937	2,224	222	148	2,119	14.3
1938	2,638	294	166	1,894	11.4
1939	2,589	224	170	943	5.6
1940	3,038	302	217	945	4.3
1941	3,264	503	209	361	1.7
1942	3,045	493	261	317	1.2

Transportation Problems of the Oil Industry

by Sidney Swensrud *

FROM the economical side, the importance of transportation does not seem to be appreciated. The industry has its own system consisting of pipe lines, tankers, trucks and river barges. Repercussions on this system now are widespread. Its wartime importance can be appreciated from the fact that two-thirds of the tonnage moved to Africa consisted of petroleum. Twenty to twenty-five per cent of the revenue received by the industry is directed to transportation, i.e., out of an average of $3.50 received by the industry for its products, approximately 80 cents is allocated to transportation.

Pipe lines accounted for the first large-scale transportation of crude oil. Then the tanker became predominant. Now the big line threatens the tanker. Shipments of 10,000 bbl. per day are sufficient to justify a tanker whereas shipments of 100,000 to 150,000 bbl. per day are required to justify a large pipe line. Use of the tanker also permits division of products at the source and the loss of refining need no be shipped.

Up to 15 years ago the railroads had a monopoly on the transportation of refined products. This was lost due to high rates. No effort has been made by the railroads to reduce costs and as a result companies have resorted to their own facilities, which they have handled with greater efficiency. For example an oil company keeps a tank truck in service as much as 20 hours a day while a pipe line is in service 24 hours. In contrast a tank car, particularly on short hauls, is in use but a comparatively short time.

It must be recognized that the railroads produced a system that is available for relief in the current emergency. Deliveries could be still further increased if they were handled like tanker cargoes, transporting a single cargo from a single point to a single destination. Actually the economy of transportation by rail might prove to be equal to or better than other forms from the standpoint of material, manpower and horsepower. There is less friction involved than in either tanker or pipe-lin transportation and rails provide a more direct route than tankers.

Another transportation development is the joint use of facilities and the practice of product exchanges.

*Vice President, Standard Oil Co. of Ohio.

DEATHS

William F. Armstrong, 56, partner with Mark Day in Armstrong & Day Oil Co., Gladewater, Tex., died of a heart attack at his home February 17. Mr. Armstrong had been in the oil business in East Texas since 1930.

Charles Raymond Barton, 51, until recently vice president in charge of manufacturing for the eastern division of Tide Water Associated Oil Co., died last week at his home in Summit, N. J. Mr. Barton was graduated from Stevens Institute of Technology in 1912 and in 1914 was assistant chief engineer of the Mexican Eagle Oil Co., Tampico, Mexico. Later he became assistant chief engineer and then chief engineer of the Edgewater Steel Co., at Oakmont, Pa. In 1916 he served in the First Field Artillery of the Pennsylvania National Guard on the Mexicon border. During World War I he was a first lieutenant with the Twenty-fourth Engineers in the American Expeditionary Force in France. During the first half of his 22 years of service with Tide Water Associated he was stationed in Tulsa. Mr. Barton was a member of the Masonic order, Sons of the American Revolution, the Whitehall Club of New York and the American Society of Mechanical Engineers. Surviving him are his widow, two sons and two daughters.

Henry C. Hanna, 58, superintendent of the Standard Oil Co. refinery at El Segundo, Calif., died at his home in Inglewood of a heart ailment. He is survived by Mrs. Hanna.

William (Missou) Hines, former vice president of E. T. Williams Oil Co., died in Denver, Colo., at age of 78 years. He was the legendary original of Missou in Owen Wister's novel "The Virginian," a friend of Buffalo Bill (William F.) Cody, and a noted cowboy of the early eighties.

H. B. Lee, traveling field auditor of Gulf Oil Corp., who lived at Bellaire, Tex., died last week. He had been associated with the Gulf company for 23 years. Since 1929 he had worked out of the Houston, Tex., office.

Robert Myron Clark, 61, died at his home in Owensboro, Ky., last week, following a short illness. He established the Owensboro Tool Co., and previously worked for the Leidecker Tool Co. in Marietta, Ohio, and as superintendent of the machine shops of the Burmah Oil Co. at Yenangyat and Yenangyaung oil fields until his retirement in 1926. Later, he returned to work for the Magnolia Petroleum Co. at Duncan, Okla., before establishing his own business in 1929. His wife, a son and a daughter survive.

Russell Siggons Nelson, 36 employe of Pennzoil Co., Oil City, Pa., died last week following a very short illness. He had been employed at the Pennzoil refinery for several years. His widow survives.

Calvin McClure Crouse, 26, an employe of Forest Oil Co., died in a Kane, Pa., hospital last week, death being attributed to pleurisy. His wife and a son survive.

Mason Hulett, of Farrel - Birmingham Co., Inc., Ansonia, Conn., and Buffalo, N. Y., died suddenly February 7, in Washington, D. C. Mr. Hulett had been connected for the past 9 years with the New York City office of the company as sales engineer and consultant on gears. At the time of his death he was on leave of absence from the company, serving on the WPB. A son survives.

Colonel Romulo Addresses Employes of Hanlon-Waters

The fall of Bataan was described by Col. Carlos P. Romulo to an audience of 600 on February 21 at an occasion arranged by Hanlon-Waters, Inc., to give its employes an opportunity to gain a better understanding of the significance of wartime industrial operations in which they are engaged. The event was held at the company's plant at Tulsa which was appropriately decorated for the eve of Washington's birthday. On the platform with the speaker were M. F. Waters, president, Hanlon-Waters, Inc.; S. S. Smith, manager, products pipe lines, Shell Oil Co., Inc.; J. H. Boyle, secretary-treasurer, Hanlon-Waters, Inc.; E. I. Hanlon, chairman of the board, Hanlon-Waters, Inc.; D. E. Buchanan, director, District 3, Petroleum Administrator for War, Houston, Tex.; Maj. Gen. J. E. Fickel, Army Air Forces; Col. F. J. Wilson, Corps of Engineers; and Maj. J. F. McManmon, Army Air Forces, some of whom addressed the meeting.

Before the Japanese invasion, Col. Romulo was editor and publisher of seven newspapers and manager of two radio stations in the Philippines. In his present tour of the United States he has repeatedly demonstrated that he is one of the Army's most effective orators.

"I am a messenger from the American and Filipino soldiers who fought side by side," Colonel Romulo insisted when he urged his listeners to do their jobs so well that soldiers of this country will never have to go through another Bataan because of a shortage of supplies. The last man to leave Bataan—Colonel Romulo—was ordered by General Wainwright to join General MacArthur in Australia under whom he served as aide-de-camp.

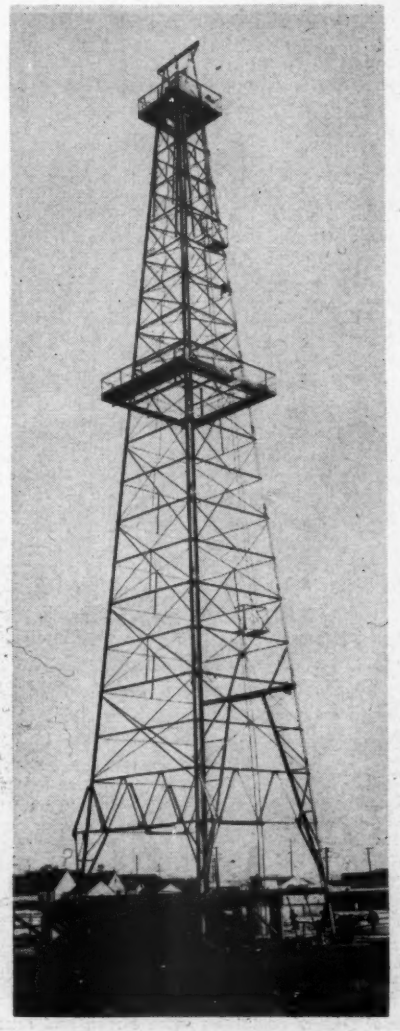
Shell SOUNDPROOFS Test Well

No effort or expense has been spared to soundproof drilling operations on this test in the Los Angeles Basin. Sheathing is practically fireproof. Ample ventilation has been provided

by L. P. Stockman

IMAGINE standing about 20 ft. from a rapidly revolving rotary table or nearby when the crew is going in or coming out of the hole with a string of drill pipe and be able to converse in a normal tone. As is well known, under ordinary conditions, conversation is carried on in a loud voice adjacent to an operating rig but in Shell's 1 Verne Community in the Gilmore Island section of the old Salt Lake field in Los Angeles Basin where a deep Miocene test is being drilled it is possible to converse in a normal tone outside the combination sheathing that entirely encloses the derrick and other moving equipment. This sheathing, in addition to being practically fireproof, was deemed necessary in order to reduce drilling noise to a minimum due to the proximity of dwellings about one block away.

Shell has not spared any expense or effort in its attempt to eliminate any possibility of creating a condition that would prove objectionable and a check of the neighborhood reveals the fact that it is impossible to hear any noises from the rig even during the evening hours when the traffic din is at its lowest ebb. Shell's Verne Community well is located about 1 mile northwest of Wilshire Boulevard's so-called Miracle Mile intersection of La Brea Avenue and Wilshire, an exclusive business and residential district, and on property that at one time contained numerous shallow wells drilled by Gilmore Oil Co. It is near the center of four old abandoned wells of which no trace remains today. These produced from an upper zone which has been drilled through in 1 Verne Community now drilling ahead at 3,000 ft. It is interesting also to note that Shell's deep test is located only about ¼ mile north of the celebrated La Brea tar pits from which over 300 complete and incomplete skeletons of saber-tooth tigers, mastadons, elephants, bison and innumerable other large and small animals were recovered.



Derrick before sheathing was applied

Shell's drilling operations in the Gilmore Island area are under direct supervision of R. E. Kettenberg, division field engineer, A. S. Baptie, division superintendent Los Angeles Basin, and S. F. Bowlby, division manager of Los Angeles Basin division.

Construction of Derrick

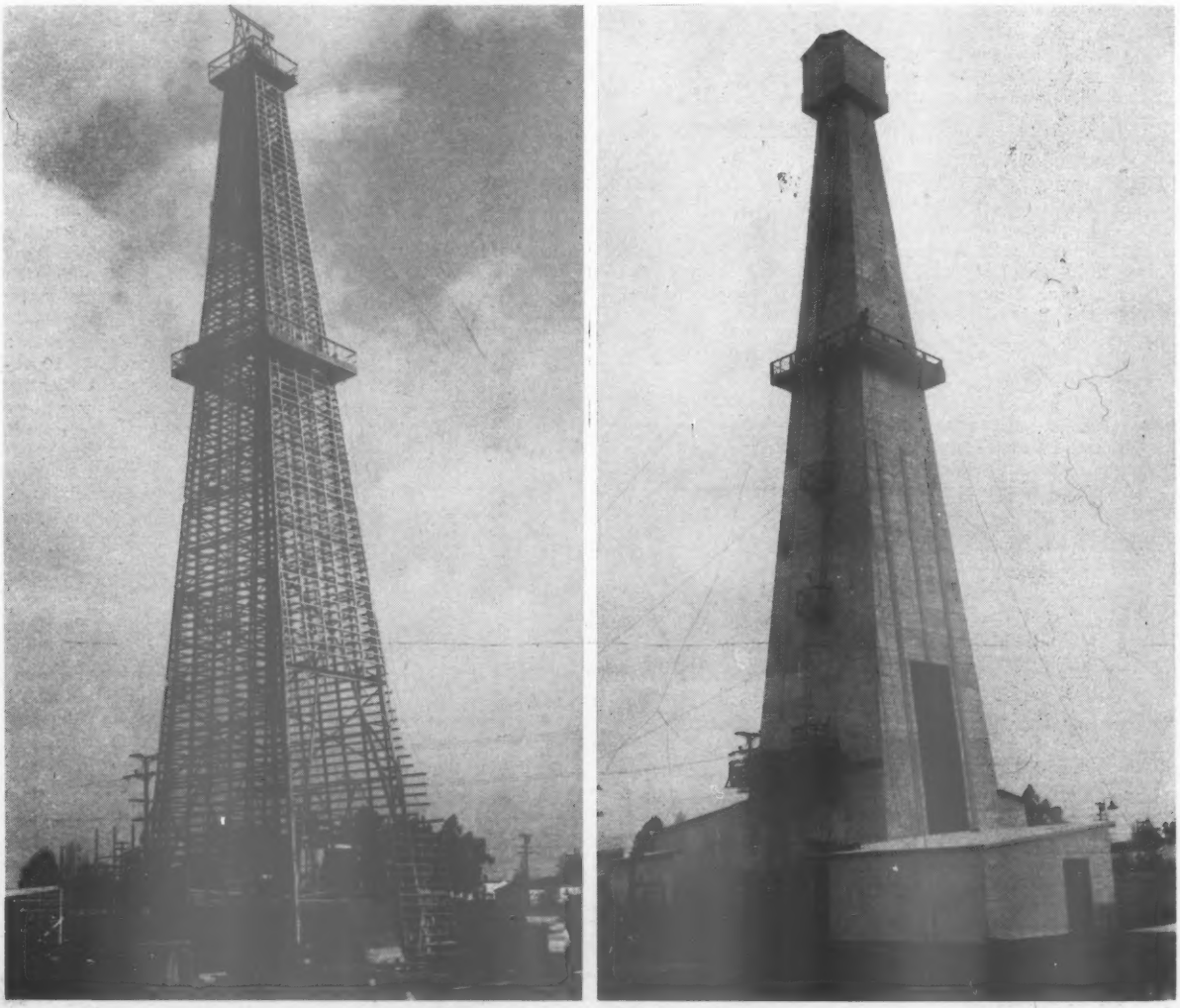
The 132-ft. steel derrick for 1 Verne Community was erected during daylight hours and in the conventional manner. Next 2 by 6-in. timbers were laid vertically 2 ft. apart from the ground to the top of the derrick on all four sides and coarse wire mesh screen was then nailed on to these vertical timbers. Next came a series of horizontal timbers to provide an anchorage for sheet transite which at present encloses every piece of equipment except the portable electrical equipment. The area between the wire screen and the transite has been filled with rock wool for a thickness of about 4 in. This insulation kills practically all the noise incident to drilling. In order to provide ventilation and at the same time keep the derrick free of gas, a series of enclosed fans and air vents have been provided. When this test got under way it was decided to permit the pumps and shakers to remain in the open but it was soon found that a slight humming noise was audible some distance from the well and accordingly this week the pumps and shakers were completely insulated by erection of a soundproof shed. Los Angeles City ordinances prevented the company from enclosing the principal electrical equipment but with this exception everything on the property is enclosed and soundproof. A high board fence has been erected around the rig and admittance is by a special pass only.

Drill pipe is pulled off the rack in the conventional manner except that

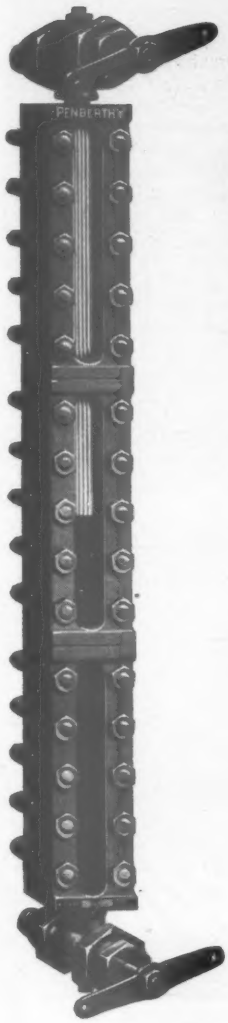
in Shell's Verne Community well a door for the A-frame opening has been provided that slides vertically along a track that keeps the door from swaying. This door which extends down to the base of the derrick is operated from the cathead by a line running from the top of the door to a pulley just below the runaround and thence to the derrick floor. After drill pipe has been placed on the derrick floor or laid down on the rack the door which is also insulated in the same manner as the entire derrick is again dropped, being kept in place by the runners or tracks along which it moves. Electrical equipment was decided upon for convenience and because it dispensed with steam and was more suitable for noiseless drilling and at the same time provided positive direct control. Large pumps are being used and the shakers and mud tanks are enclosed in a compact unit. Two 2,500-bbl. tanks have been erected and lead lines have been laid from the well to the tanks. In order to keep the well under control at all times, the company is using three blowout preventers. Extraordinary safety measures have also been taken to permit the derrick man to get out of the enclosed derrick in case of emergency. Shell spent approximately $9,000 rigging up this well before it was spudded. The precaution taken in the drilling of this Miocene test is cheap protection against what might prove a costly undertaking if the well should get away not to mention the possible effect of such a condition on future drilling within the corporate limits of the city of Los Angeles.

It may be another several months before the final status of Shell's Verne Community test is decided because this well will determine the future of work in this area. The hole will be carried down into the basement if possible and at least to 9,000 ft. unless the basement is found sooner although tests may be made from time to time of any oil sands found. The advisability of ascertaining exactly what lies beneath the Salt Lake field becomes quite evident when one considers that Shell is committed to the erection of a costly soundproof, odorless, steel-concrete building to entirely house future drilling and which at the same time will not offend the esthetic sensibilities of anyone. The present test is being drilled to determine if there is enough recoverable oil and/or gas to justify the large expenditure necessary. In addition to the cost of the development building, Shell would also have to lay two pipe lines, the franchise for which was secured several months ago prior to the start of work. This development building would have to be large enough to permit the drilling of an adequate number of directionally drilled wells to drain the reservoir and at the same time protect the interests of all leases and properties.

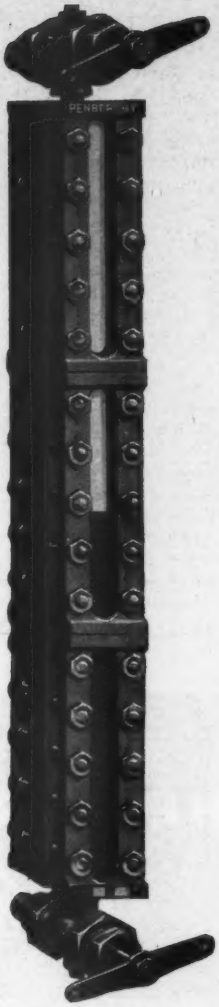
The present test is a straight hole but future wells will of necessity be



Left: Derrick with vertical and lateral timbers containing wire screen and ready for the nailing of outer sheathing. Right: Exterior of derrick with sheathing applied and containing wire and rock wool inside sheathing

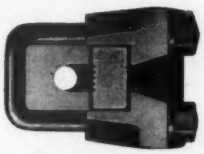


QUALITY UNCOMPROMISED



PENBERTHY *Reflex* DROP FORGED STEEL LIQUID LEVEL GAGES

Liquid shows black—empty space shows white. Preferred wherever liquid level must be easily and positively visible . . . and when liquids are under high pressure or at high temperature.



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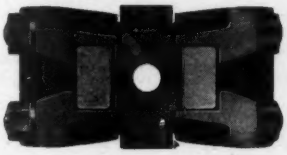
Used to observe color and density of liquids under high pressures, and/or temperatures. Construction is exceptionally rugged . . . similar to Reflex types.



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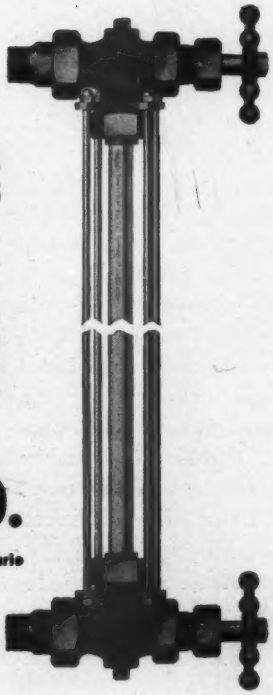
PENBERTHY *Reflex* WATER GAGE SET

Water shows black — steam shows white. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler.



PENBERTHY DROP FORGED STEEL LIQUID LEVEL GAGES

Made of Chromimum-molybdenum alloy temperature-raising steel, extra heavy throughout. Stainless steel trimmed. Tubular glass type gages also available in various other metals suitable for practically all conditions.

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DETROIT, MICHIGAN • Canadian Plant; Windsor, Ontario

PENBERTHY PRODUCTS

THEY DRILLED FOR OIL . . .

FOUND "3280 MACHINE GUNS"

It happened in the Illinois Field. Each of 100 wells required 300 feet of 10¾-inch casing. Figured with standard casing, more than 491 tons of steel would have been used. Doing the work with ARMCO Spiral Welded Casing required only 327 tons—a saving of 164 tons of precious steel, or enough to build 3280 .50 caliber machine guns.

You also will find that "Spiral Welded" Casing gives important savings in time and labor as well as steel. Slip-joint collars and accurately machined pipe-ends assure fast line-ups without using clamps. Slips and elevators fit the pipe without special equipment. Threaded ends and collars that used to be cemented-in and never reclaimed are eliminated. Utmost metal economy is achieved by specifying the one right wall in any diameter. Uniform lengths run up to 40 feet, which means there are fewer joints to assemble, fewer sections to handle.

Take a step toward Victory by using economical ARMCO Casing for vital wartime wells. Also consider "Spiral Welded" pipe for gas gathering lines. Prices and shipping promises on request. The American Rolling Mill Company, Pipe Sales Division, Middletown, Ohio; 501 Mayo Bldg., Tulsa, Okla.

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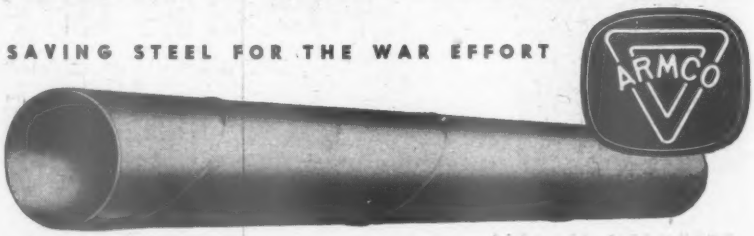
ARMCO SPIRAL WELDED PIPE

SAVING STEEL FOR THE WAR EFFORT



DISTRIBUTED BY THE NATIONAL TANK CO., TULSA, OKLAHOMA AND BRANCHES

directionally drilled. Shell's Verne Community lease takes in the Gilmore Stadium, Hollywood Baseball Park, Farmers Market, Pan Pacific Auditorium, the Metropolitan Insurance tract, Shell fee lands and a small piece of Los Angeles school property. The area is bounded on the north by Rosewood Avenue, on the south by Wilshire Boulevard, on the East by June Street and on the west by La Cienega Boulevard. In addition to the Verne Community lease, Shell has a Salt Lake Community lease embracing approximately 5,000 lots many of which contain residences and must be developed by directional drilling from the central control housing the drilling equipment adjacent to the present well.

Location of Field

The Salt Lake field occupies a tract of nearly flat land at the feet of the Santa Monica Range about 2 miles from the base of the mountains which lie to the north. The ground slopes gently to the south and west from an elevation of approximately 225 ft. and drainage is into Ballona Creek. The Salt Lake field which at one time contained about 1,200 acres of productive land is peculiar among the general run of California oil fields in that the surface is entirely covered by late sediments so that no evidence whatever is given by the surface as to the structure beneath. The La Brea tar pits were the only surface evidence of the presence of oil in the area. Although somewhat obscure, Salt Lake is probably a faulted monocline, based on limited data available and producing well depths. The age of the productive measures in the old wells is conjectural. The upper zones have been considered Pliocene for a number of years but many strongly suspect Puente of middle Miocene in a badly faulted anticline. This should be definitely determined by fossils when Shell begins to core in the Verne Community test. The La Brea tar pits definitely reflect a major fault of deep-seated origin. Most of the old wells in the Salt Lake field were abandoned a number of years ago to make land available for subdivision purposes but the real estate boom broke soon after abandonment of the wells and consequently this land has remained undeveloped.

The Salt Lake field was discovered by the Salt Lake Oil Co. in 1902 but the bulk of the drilling was done between 1905-10. Depths of wells ranged from 800 ft. to 3,000 ft. with an average of 1,725 ft. and wells were drilled almost entirely with standard rigs. The production was characterized by low gravity, high viscosity, high sulfur and fair gasoline content. The first deep drilling was done in 1885 by those pioneers, Hardison and Stewart, who later founded the Union Oil Co. This well was abandoned as a duster at 1,780 ft. and was located southeast of the La Brea tar pits and south of Wilshire Boulevard. The deepest well drilled in the Salt Lake field was 1 Rosemary of Union Oil Co. which reached a depth of 5,594 ft. in 1910 and was at the time the deepest hole drilled in the state.

Spudding crew standing in A frame with vertical sliding door raised

Inspecting the rock wool used as insulation in Shell Oil Co., Inc., 1 Verne Community, Gilmore Island, Los Angeles, Calif. Left: R. E. Kettenberg, division field engineer, and A. S. Baptie, division superintendent, Los Angeles division, both of Shell

Universal HF alkylation

Anhydrous hydrofluoric acid, HF in chemical symbols, offers to the refiner of today and tomorrow a whole bag of tricks for synthesis of several petroleum and petrochemical families of products—ARCH L. FOSTER in OIL AND GAS JOURNAL January 7, 1943

The most important trick in that bag right now is the HF alkylation process, invented and developed by U.O.P.

It is now being licensed for commercial operation by Universal and many plants are under way

It is important because it produces in huge volume one of the vital constituents of 100-octane gasoline

And Mr. Foster goes on to say:

> HF has the advantage of forming very little if any sludge or tarry by-product to complicate the processes .....
>
> In general the recovery of the highly volatile catalyst is simple—a mere matter of vaporization from other materials, of careful fractionation, in some cases

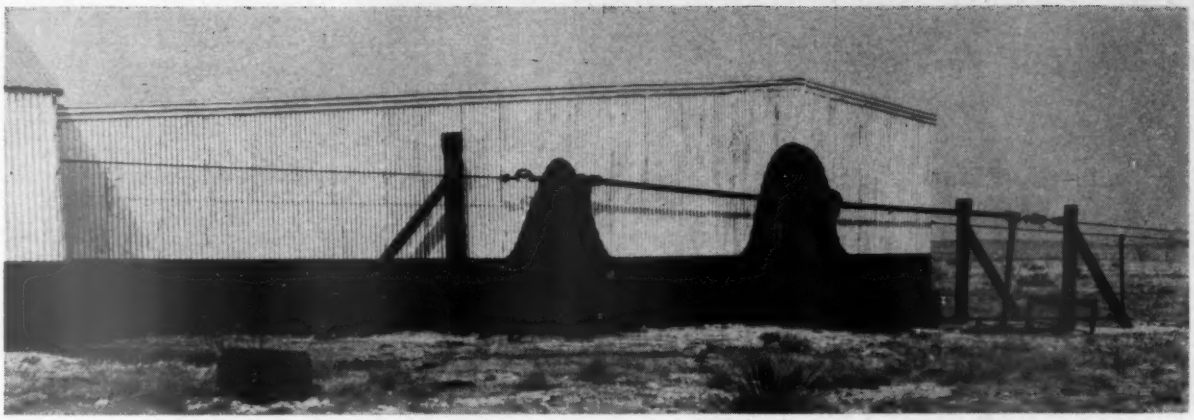
From this you can see how much HF alkylation will help the fighting flyers of Uncle Sam

OIL IS AMMUNITION—USE IT WISELY CARE FOR YOUR CAR FOR YOUR COUNTRY

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

THE REFINERS INSTITUTE OF PETROLEUM TECHNOLOGY



Old standard pumping rig converted to four-stroke pumper, a common sight in the Howard-Glasscock-Chalk-Clay field

Combat Corrosion in West Texas

Except for corrosion, the West Texas field discussed here would be an easy one to operate. But this evil makes it necessary for the production department to spend much of its time pulling rods and tubing.

by Harry F. Simons

WEST TEXAS has long been noted for its corrosion problems but admittedly the worst spot in the area is the Chalk-Clay field in Howard and Glasscock counties south of Big Spring, Tex. Those most familiar with the troubles claim that not only is the corrosion the worst in West Texas but it is the worst in the world. At least, it has been going on for a number of years and no solution has yet been found although a number of measures have been attempted.

The latest has been the installation of cement-asbestos fiber pipe in the flow lines for the purpose of reducing or eliminating corrosion there and stray electric currents which may affect the tubing. So far, it seems to be producing results although sufficient time has not elapsed to credit the step with any outstanding success. The users have their fingers crossed and hope the reduction in pulling jobs will continue.

The cement-asbestos pipe was put in use after tests for stray currents were made in the field. So many electrical currents were found that the situation was more confused than clarified. Also, the results of surveys did not correspond to those usually found and it was almost impossible to come to any conclusion through them. Insulating flanges had been installed in the field and they are still in place but it was hoped that the use of a nonconductor pipe might eliminate some of the currents and some of the corrosion. At the worst, no harm could come from such a step and at least the corrosion in the lead lines would be stopped.

Many of the operators in the field do not agree with the stray electric-current theory but believe that corrosion is due to direct chemical attack by the water produced with the oil. This water contains not only the usual salts but it also has a high hydrogen sulfide content. To add a little substance to the contention of this group, the corrosion is mainly on the inside of the flow lines and tubing although there is some outside corrosion.

Constant Vigilance Required

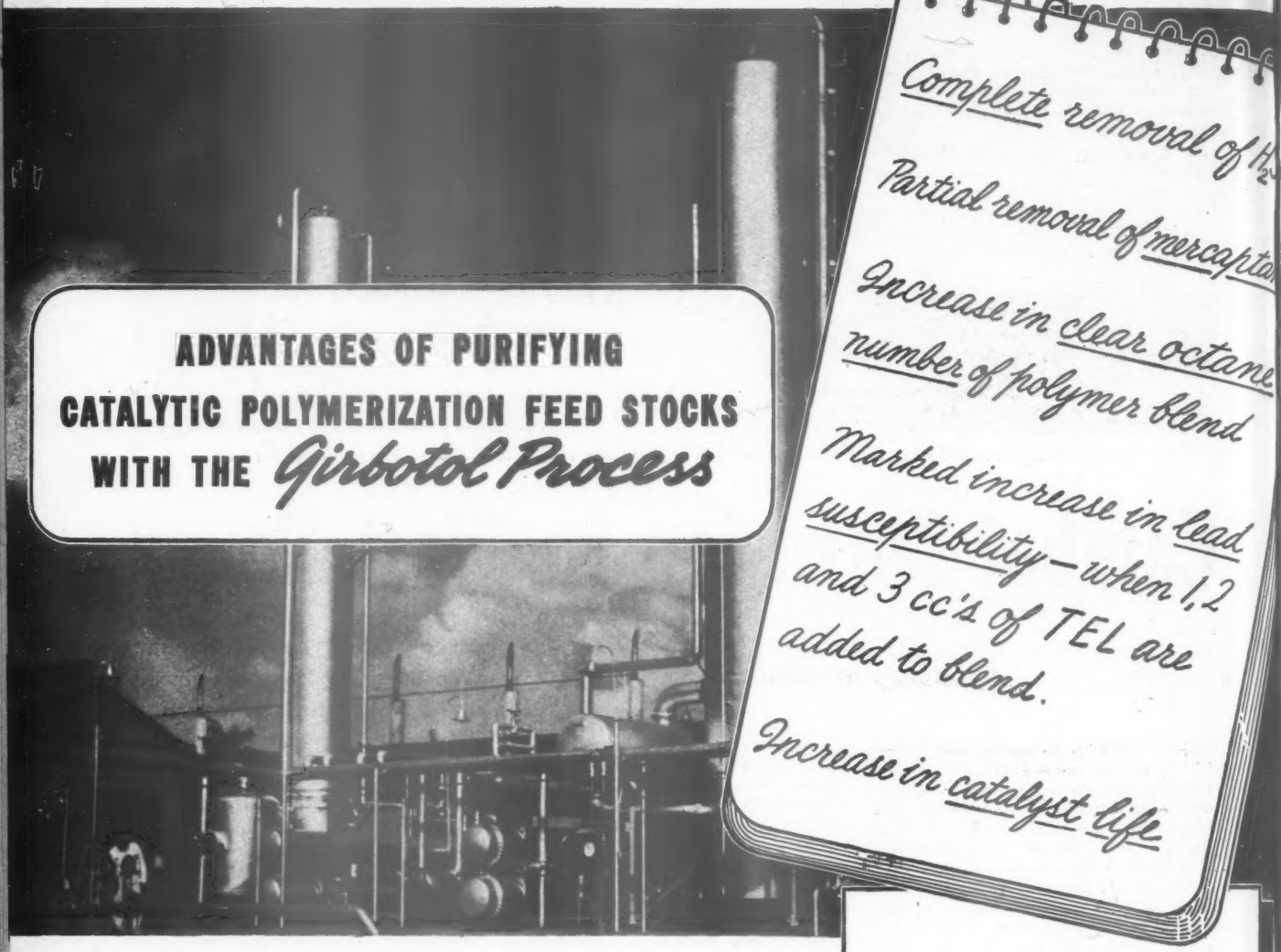
In some cases wells must be pulled as often as once a week to search for leaks in the tubing. When the leaks are large they are easily found but when small a pressure test must be used. Operators in the field are equipped with modern pulling units and have special equipment for testing the tubing while standing in the derrick.

On one well two pulling jobs were necessary in 1 week recently. The first time a leak was found at about 1,800 ft. and the second time a split was found about 2,800 ft., 200 ft. off bottom. Outside of the tubing there was little corrosion in the hole and about the normal corrosion near bottom. The tubing used is H-40, 2½-in. external upset and is a little over a year old.

The company using the cement-as-

Results of corrosion in the Howard-Glasscock-Chalk-Clay area, Texas. New 4-in. lead line alongside old one which lasted a little over 3 years. Note clamps on old line. In some cases joints of pipe were almost completely covered with clamps

ENGINEERING NOTES ON GIRBOTOL GAS PURIFICATIO


Complete removal of H_2
Partial removal of mercapta
Increase in clear octane number of polymer blend
Marked increase in lead susceptibility — when 1,2 and 3 cc's of TEL are added to blend.
Increase in catalyst life

ADVANTAGES OF PURIFYING CATALYTIC POLYMERIZATION FEED STOCKS WITH THE *Girbotol Process*

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The GIRDLER CORPORATION

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SPECIALISTS IN BETTER GAS PROCESSE

bestos pipe kept rather a close check on the hours the pulling machine was operated. Before installing the cement-asbestos pipe pulling machine time was running close to 70 hours per month on the 27 wells and at present it is running about 20 hours per month. However, at the same time the cement-asbestos pipe was installed considerable other replacement of equipment took place.

The experience of another company is about as bad as any in recent history of the field. On November 28, 1941, a new string of 2½-in. EUE H-40 tubing was run in a well. In the next 8 months the well was pulled 11 times and as many joints thrown out because of leaks. On June 18, 1942, the well was pulled and the tubing examined with a tuboscope.

The inspection showed that 10 out of the 74 joints were completely satisfactory for further use, 30 joints were graded No. 2 which meant they could be used further and 44 joints were No. 3 grade, or suitable for line pipe. The tuboscope examination also showed the condition which has existed all along, i.e., that the corrosion occurs the complete length of the tubing and is not confined to any one spot such as near the fluid level.

At present work is being done in development of an impervious and insoluble coating to be applied to the inside of the tubing. Such a coating has worked on wells bothered with corrosion where gas-lift was the production method but the slapping of the rods against the tubing causes fractures in the coating. If a coating which will withstand the rod pounding can be developed, many pulling jobs may be eliminated.

Special steels have been found useful in preventing corrosion of lead lines although the steel which gave the best service there proved unsatisfactory for tubing. Cement-lined steel pipe has also given good service in flow lines.

Naturally considerable rod trouble has been experienced in the field although by using the best grade of nickel-steel rods a life of about 3 years can be obtained. Size of the rods used in the field (the deepest pay horizon is 3,000 ft.) is ¾-in. Lower grade rods corrode and develop fractures more frequently than do the better rods. A cure for this trouble (used in another field) is to lay the rods down occasionally which permits them to normalize.

All the known remedies for preventing corrosion fatigue have been tried in the pool. Zinc couplings were used for a time but after considerable experience was gained it was found that no great help was obtained. One operator went so far as to install bronze sucker rods. These rods were reported to have been ⅞-in. thick when installed and when pulled from 6 months to a year later were only ⅝-in. thick. The cost of the bronze rod was rather high.

Vagaries of Field

Parts of the field show worse corrosion than others and just to complicate matters further the corrosion is not constant and it changes from time to time without any apparent cause. One area may not show any great trouble for a time and then suddenly will break out in a rash of tubing leaks. The reverse is also true, wells which have given trouble going on their good behavior.

A number of things point to straight chemical attack or at least chemical attack combined with other factors. For one thing the wells which make a large amount of water seem to corrode more quickly. Bottoms of tanks handling the production (which includes the water) corrode quickly but the upper part does not. Flow lines do not corrode as badly on the tops of hills as they do on hillsides.

Less trouble has been experienced with the tubing in many wells since they were restricted slightly. Formerly wells were produced at capacity but in recent months the production has been curtailed and there has been a drop in both rod and tubing jobs. In another case, a well which produced a large amount of water was plugged back and a partial shutoff obtained. The drop in tubing corrosion was noticeable.

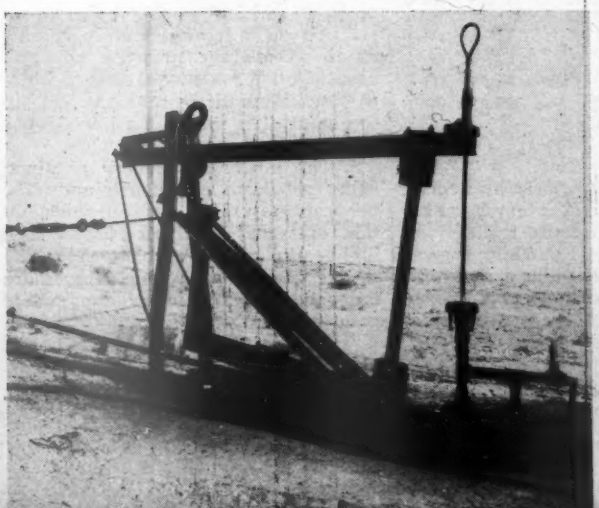
The field was discovered in 1926 but the principal development took place in 1928 and later. It produces from five different pay formations, the oil from three of the pays being corrosive. The first pay is the 1,300-ft. Yates sand which gives practically no trouble. Second pay is the Chalk sand at 1,800 ft. which produces sweet oil and which gives no trouble. The 2,200-ft. lime pay found mostly on the west end of the field is very corrosive. Another lime pay at 2,500 ft. is corrosive but not as much as the 2,200-ft. level. The Roberts lime pay at about 3,000 ft. contains sulfur water but it is less corrosive than the two pays immediately above.

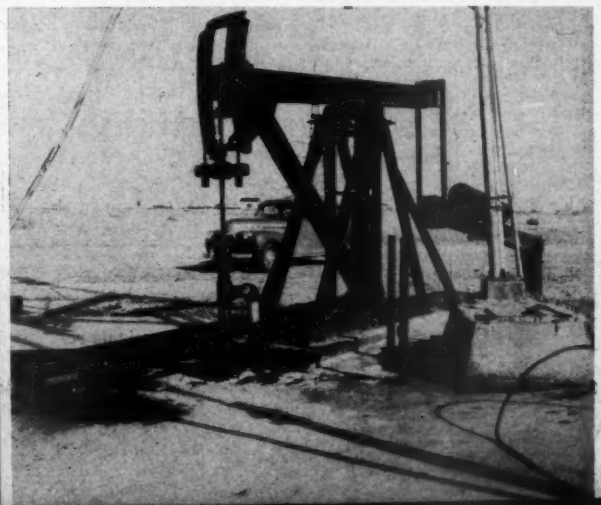
Because of the various pay depths and the different development periods in the field, practically every pumping arrangement known is used in the field. The surface equipment includes all types of back-side crank pumping, four-stroke pumpers, band-wheel powers, geared powers, individual electrically driven units, and individual internal-combustion engine driven units. The variety of jacks used with the powers is legion.

Tubing used on most of the wells is 2½-in. with ¾-in. rods on the deeper wells and ⅝-in. on the shallower ones. The wells produce on the average about 2 bbl. of water for each barrel of oil produced with some wells being in the stripper stage and some still capable of producing considerable quantities of oil.

Owing to a favorable pipe-line situation the field's output is only slightly restricted and consequently it can produce enough oil to pay for the numerous rod and tubing jobs. While an approximate 10 per cent restriction has been helpful, in some cases any severe curtailment might result in a number of other troubles. Except for corrosion, the field would be an extremely easy one to operate. As it is, the pulling of rods and tubing takes a great share of the production department's time.

Left: Jack with cam designed to produce a straight polished-rod motion on a well in the Howard-Glasscock-Chalk-Clay field. Right: Counterbalance used to help lift rods on a 3,000-ft. well. In some instances a reverse application is used, rods not being heavy enough to fall against long rod lines





Air-Drive Experiments on Long Horizontal Consolidated Cores*

by Harry Krutter and Robert J. Day†

LONG consolidated cores seem to be the more desirable experimental medium for studying secondary recovery of petroleum from reservoir rock in the laboratory. Five such cores were studied (see Table 1 for physical characteristics). The sand is a fairly well rounded, well sized and moderately well sorted medium-grained sediment. The average grain size is around 0.25 to 0.50 mm. in diameter. The grains range from 0.1 to 1.0 mm. The mineral composition is: Quartz, glossy, fairly well rounded, 75-80 per cent; dark (black and greenish) chert (subangular), 5-8 per cent; feldspar, most of it altered to kaolin 3-5 per cent; dark rock fragments (slate), traces; carbonates, traces; limonite, produced by alteration of siderite, 2-3 per cent; pyrite, traces; clay (partly from feldspar, partly original), 6-10 per cent. The oil used in all experiments was a close-cut oil with a density of 0.820 g. per cc. at 25° C. or 39.2° A.P.I. and viscosity of 5.81 centistokes (4.76 centipoises) at 25° C. Most of the experiments were performed at or near 25° C. in a thermostated cabinet.

The first problem investigated was that of the air drive at constant input pressure on cores initially 100 per cent saturated with oil. This study shows that the rate of production rises rapidly and then levels off. The exact point of air break-through was not detected but the rate of flow of air increases very rapidly with time so that at the end of the experiment when residual oil saturation is 44.8 per cent the air flow is 80 per cent of what it would be if no oil was present. Five experiments were carried out on R1. The material balance follows:

(a) Inlet pressure (cm.)	10	20	20	30	40
(b) Original oil in core (cc.)	241.4	242.2	243.2	237.5	235.8
(c) Oil collected (cc.)	109.2	117.8	118.2	117.9	117.9
(d) Oil in trap (cc.)	6.2	....	6.3	15.2	21.5
(e) Oil left in core (cc.)	122.5	....	109.0	95.0	95.3
(f) Residue oil saturation, per cent	50.4	....	44.8	39.1	39.2
(g) Oil lost (cc.)	3.5	....	*9.7	*9.4	2.0
(h) Time required for (d) hrs.	671	288	336	337	510
(i) Per cent original oil collected	45.3	48.6	48.6	49.6	49.6
(j) Per cent oil collected (pore vol.)	44.9	48.4	48.6	48.5	48.1

*Leak in coating.

Amounts collected from pressures 20 to 40 are practically identical, averaging 117.7 cc. against 109.2 at 10 cm. pressure. This indicates that increasing pressure means increased ultimate recovery until an optimum pressure is reached after which no further appreciable increase in ultimate recovery is obtained. It will also be seen that the greater the rate of flow of air the greater the amount of oil entrained and vaporized and therefore carried along with the air. Air-oil ratio versus saturation relationship is independent of the pressure gradients used, i.e., given a field with a given saturation (55 to 85 per cent) a barrel of oil can be produced at different pressures with the same total amount of air. However, since the higher the pressures the higher the rate of air flow, then the higher the pressure the smaller the time required to produce a barrel of oil. It is very doubtful that this relation holds for lower saturations.

Experiments With Cylindrical Cores

In the experiments with cylindrical cores it was observed that the use of high, constantly maintained pressure led to an average recovery of 1.8 times that obtained by the use of stepwise pressure increases. The increase varied with individual cores from a factor of 1.2 to 2.7 and led to the recommendation that the use of high pressures would be advisable in actual practice as long as bypassing did not result. Experiments were carried out on the long horizontal cores and showed that the recovery by stepwise increase of pressure resulted in a recovery of 66.94 cc. while a constant pressure resulted in a recovery of 85.9 cc., a 1.28-fold increase by the use of high pressure compared with stepwise pressure increase.

There has been considerable discussion in regard to the relative merits of methane as compared with air as a driving medium. Gas has a great advantage over air because the problems of corrosion of equipment and oxidation of the crude do not enter. However, there are disadvantages of the cost and handling of gas. Aside from these economic factors the question is whether or not the ultimate recovery is different for gas or air. These experiments show that the ultimate recovery is, within a few per cent, the same for either methane or air.

Water, Air or Gas?

A major problem is whether water flooding or air or gas drive should be used in a secondary-recovery operation. Another is whether an air-drive project can be followed by a water-flooding project, also, if a property is assumed to be a good water-flooding possibility, which will recover the more oil: straight water flooding or air drive followed by water flooding. By use of a water drive after the completion of an air drive, the total recovery was 85.6 per cent of the original oil in the core. This recovery is indeed remarkable and opens up the possibility of the use of water drive following air drive. The same core, subjected to water drive alone, resulted in a recovery of 65 per cent of the original oil content. These experiments indicate that air followed by water is more efficient than straight water drive and while general conclusions cannot be made on this basis, it shows these points will bear more investigation.

Results of the experiments, subject to self-evident qualifications, show:

1. Relative permeability to air as a function of per cent oil saturation for a given core is independent of pressure gradient in the saturation range up to 85 per cent.

2. Air-oil ratio expressed in volume of air at average pressure per volume of oil for a given core is independent of pressure gradients within the saturation range of 55 to 85 per cent.

3. The ultimate recovery obtained using air drive on an originally 100 per cent saturated core depends on the pressure gradients used. The higher the pressure the greater the recovery until an optimum pressure is reached, after which no appreciable gain in recovery is obtained with

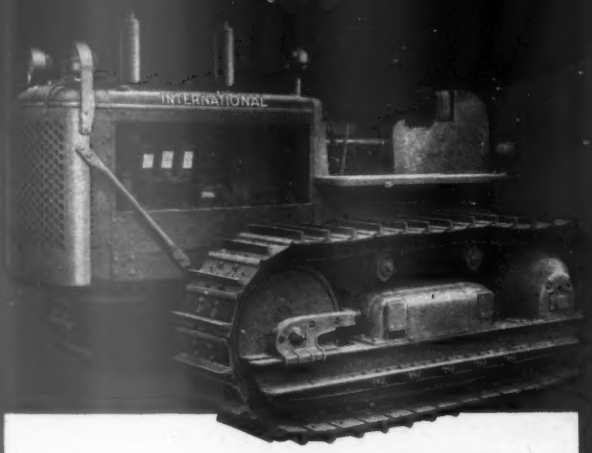
(Continued on Page 83)

TABLE 1—Physical Characteristics of Cores

Core No.	Length Cm.	Length In.	Diameter Cm.	Diameter In.	Cross-sectional area Sq. cm.	Cross-sectional area Sq. in.	Bulk volume (cc.)	Weight Grams	Weight Lb.	Pore volume (cc.)	Permeability (md.)	Porosity (%)
R1	87.0	34.3	4.56	1.80	16.3	2.53	1,429	3,147	6.93	243.2	522	17.1
R2	92.1	36.3	4.61	1.81	16.7	2.59	1,537	3,234	7.12	287.0	322	18.7
R3	53.2	20.9	4.74	1.87	17.6	2.74	939	1,971	4.34	179.9	1,020	19.2
R9	91.2	35.9	5.58	2.20	24.5	3.79	2,230	4,619	10.17	433.3	785	19.4
R10	132.6	52.2	9.30	3.66	67.9	10.5	9,010	20,000	44.1	1,312.0	38.1	14.6

*Abstracted from a paper presented before the A.I.M.E., New York City, February 15-18, 1943.

†Pennsylvania State College.



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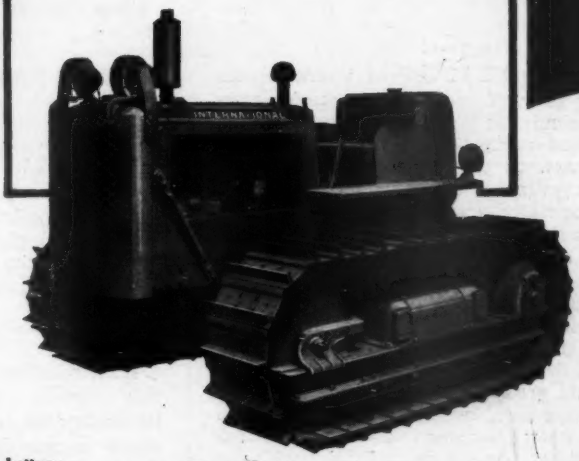

Top to bottom: International TD-18, TD-14, and TD-9 Diesel TracTracTors. The International T-9 is not shown.

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ISOMERIZATION—A Useful But as Yet a Little Used Tool for the Refiner

by Arch L. Foster

PART 1

ISOMERIZATION of hydrocarbons, as well as other organic compounds, is one of the newest and least understood of the hydrocarbon reactions which have been discovered, investigated and developed into commercially practicable processes within the last decade.

One of the earliest patents employing this reaction was issued in 1934 (U. S. Pat. 1985792). German, Austrian and other European patents were issued as early as 1912, dealing with isomerization of specific olefins and groups of hydrocarbons, such as n-pentane, which was changed to isomeric pentenes catalytically. These earlier patents dealt chiefly with individual hydrocarbons probably for specific purposes as a part of chemical syntheses, and apparently did not contemplate affecting the properties of motor and aviation fuels.

Because of the rapid advance in the technology, patents and commercial applications of isomerization, a study of the reactions which have been uncovered, the results accomplished and the possibilities of the reaction for further development is revealing. Isomerization was originally thought of, more particularly in the petroleum industry, as a means for changing the structural arrangements of carbon atoms in a hydrocarbon chain to give the product different properties. In fact, a definition satisfactory for our present purpose is that isomerization is the reaction by which the carbon atoms and/or their connecting bonds in a hydrocarbon are rearranged to yield other hydrocarbons of like molecular weight but with structural arrangements differing from that of the original material.

Most technologists have thought of isomerization primarily as a means to an end, as an adjunct reaction to supply a material desired for a more important reaction by which a final product is made. It is only more recently that we have come to think of it as a major process in itself, forming products which are in themselves and without further processing finished materials of commerce or which enter directly into finished products. Isomerization first became of primary importance to the refiner as a means of converting the large amounts of normal, straight-chain light hydrocarbons—butane, pentane, etc.—to isoparaffins. Alkylation as it is known in the refinery takes advantage of the mutual reactivity of isoparaffins and olefins to make isoparaffins of greater molecular weight and more enhanced antiknock tendencies. Isoparaffins were found several years ago to show a definite and predictable reactivity in which they differ distinctively from normal paraffins which are comparatively inert at any temperatures and pressures short of those under which molecular decomposition begins. The ratio of normal to isoparaffins of the same molecular weight in light hydrocarbons from natural gas and petroleum is high, from two to five times as much normal butane as isobutane being found in "wet" natural gases, as a rule.

More recent developments indicate conclusively that the isomerization reaction is taking its place among the more important processes. So far as can be foreseen for the near future the quantities or the variety of charge

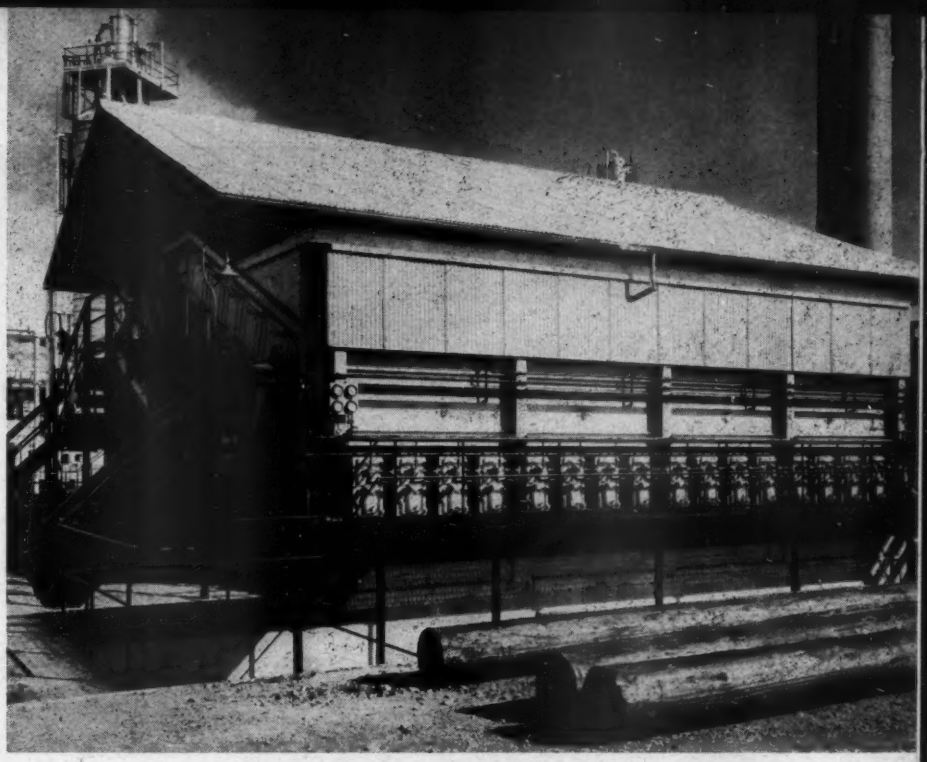
Recent advances show that the newly commercialized isomerization reaction may be used successfully to make final refined products such as isopentane and isohexane for use in aviation and motor fuels. Some of the more complex isomeric molecules in the C_9-C_{12} range of paraffins may be so produced, either by isomerization alone or by isomerization of smaller molecules and alkylation of these isomers to make the desired product. The possibilities are great for the use of this reaction to form isomers for chemical syntheses; its use for changing structure of heavy hydrocarbons such as lubricating oils, etc., offers still more interesting avenues for research.

stocks processed by isomerization methods will be much smaller than those handled in, for example, catalytic or thermal cracking processes. Nevertheless, the application of this newly developed process to the production of both intermediates and major blending agents for aviation and motor fuels, and the theoretical and actual possibilities of its application to a host of other products and processes open a new vista for its usefulness in refining and chemical technology.

Isobutane for alkylation purposes can be obtained in two ways, by superfractionation of light hydrocarbons to separate the iso from the normal butane, and by isomerizing normal butane to the iso form by the use of appropriate catalysts and reaction conditions. Except in isolated instances not enough isobutane is available to the individual refinery or gasoline plant to carry on a major alkylation operation, whatever the supply of butenes may be. At the same time, in both refineries and gasoline plants a surplus of normal butane is available in comparison to either butenes or isobutane. The ultimate requirement for both in alkylation is a 1 : 1 ratio, although in processing the butenes may be diluted with 5 to 20 volumes of isobutane, chiefly to avoid polymerization of the olefins in preference to alkylation. Therefore any process which will isomerize the normal butane permits utilization of a greater amount of the available C_4's. So the development of isomerization methods served an immediate practical purpose.

By this process combination the same results may be achieved in preparing isooctane from normal butane and butene in two simple steps as are obtained by the dehydrogenation of isobutane to isobutene, polymerization to isooctene and hydrogenation to isooctane. The alkylation steps are easier to carry out and require much milder temperature and pressure conditions than the dehydrogenation and hydrogenation steps of the older process. Three catalysts have been developed to a successful commercial point for this alkylation reaction: sulfuric acid, the first one brought out both in America and in England; anhydrous aluminum chloride, and anhydrous hydrofluoric acid, HF. These last two are also effective isomerizing catalysts, and it appears feasible to employ either of them in a tandem combination of isomerization followed by alkylation, using the same catalyst under somewhat different conditions for each step in turn.

One or the other of the processes using these catalysts is now building or operating in a large number of refineries in this country. The products so made are going into aviation fuels, exclusively so far as we know.



Refinery heating is an exact science; refinery heaters are the result of highly developed engineering design

Because of the mild operating conditions required and in the case of HF at least the relative ease of catalyst recovery together with the extreme need filled by the alkylated product, this isomerization-alkylation team seem destined to hold a large place in refinery technology. The above summary, of course, is a statement of the obviously well known; these processes have other possibilities for the future which are inherently tremendous.

Isomerization of Hydrocarbon Mixtures

Without being meticulous as to the first one which became commercially successful, the last 5 years have brought out three processes, those by Shell Development Co., Universal Oil Products Co. and Standard Oil Co. of Indiana. Other companies, Texas Co. and Standard Oil Development Co. among them, have been active. The Indiana process, known as the isomate process (based on U. S. Pats. 2220090, -091 and -092, etc.), employs anhydrous aluminum chloride and a promoter such as hydrochloric acid, treats either a single hydrocarbon to change its structure without any desired molecular weight change, or treats a mixture of hydrocarbons such as low antiknock naphthas to improve their octane rating and motor-fuel performance by increasing the isoparaffin content. Patents on which the Shell process is based in part (U. S. 2105850, 2249366, 2250118 and 2250410) treat butane or a hydrocarbon mixture with aluminum chloride or a complex formed by $AlCl_3$ and aromatic or other hydrocarbons and a hydrogen halide, i.e., HCl. The Universal process (U. S. Pat. 2216285 and later issues), uses either metallic oxides or aluminum chloride and HCl, to achieve the same qualitative results as the others mentioned. These processes use nominal pressures and temperatures up to about 300° F., conditions mild enough to warrant the assumption of low costs and relatively inexpensive equipment.

All of which, along with other matters, brings us to the crux of the situation of the present and future outlook for isomerization. That this reaction can be and is being applied to the improvement of quality of low-grade distillates is a proved fact. That it can be and is being applied to the change of configuration of individual paraffinic hydrocarbons to make them usable in other processes is also fact. These two fields, then, appear to be the scope of application of isomerization, present and future, as far as can be foreseen now.

The application of isomerization to mixtures of hydrocarbons in distillates, etc., has a very definite and potentially important place in motor and aviation-fuel technology, provided of course that the desired results can be accomplished. Assume a low-octane-number distillate including any or all normal paraffins up to duodecane (12 carbon atoms, b.p. 421° F.), along with varying amounts of different branched-chain paraffins, a fraction such as the middle or heavy naphtha remaining in straight-run gasoline after taking off a lighter, higher octane number fraction. Such a product is predominantly normal paraffinic, low in octane number and in vapor pressure. The Indiana isomate process, using aluminum chloride and HCl as catalyst and pro-

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LARGEST INDEPENDENT PRODUCER IN AMERICA OF BUTADIENE SYNTHETIC RUBBER

moter respectively, was developed to treat this type of material to change the octane number and more or less incidentally the vapor pressure-volatility characteristics. The octane number of the stock may range from zero thereabouts to 25-30, or even higher, depending on its source and individual properties.

It will contain small amounts of hexane and heptane with large percentages of the higher components in the range. Heptanes and lower, if present, will be converted to isoparaffins ranging in octane number from 100 in the case of isooctane (2,2,4-trimethylpentane) to between 50 and 90 for some of the higher isomers. As molecular weight increases the number of possible isomers increases rapidly. Egloff ("Isomerization, etc.," Reinhold Pub. Co., 1942) shows 355 possible isomers for duodecane; their antiknock ratings are not all known to the writer, but certainly vary between wide limits. Isomerization of these more complicated hydrocarbons can produce any one or more of the possible structures; no conclusive data are available to indicate which form or forms will be the preferred product from such a reaction; extended reports of analyses have not been published although much work has been carried out on the subject.

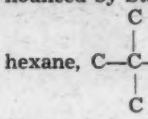
As to practical results, these low-grade distillates have been raised from very low octane values to 65-70 rating, according to claims made. This means improving distillates too low to be included in house-brand motor fuels with any permissible amount of tetraethyl lead to a point which makes them first-class blending material for either regular or premium-grade fuels. It means an excellent saving of lead and permits the marketing at regular prices of fuels otherwise too poor to be used for motor fuels at all, except possibly by blending in small percentages with large amounts of cracked distillates and very light fractions along with large quotas of lead.

Secrecy now cloaks whatever use may be made of this reaction and process for military fuels, aviation and otherwise. It appears reasonable to believe that specially selected stocks, treated under carefully determined conditions to achieve specifically the desired results as to octane number, can be improved to a point where they will be advantageous for use in military truck, car and tank fuels of 80-octane number and above. Making blending stocks which will add volatility and relatively high octane number to aviation fuels appears highly possible, also, by the same procedure, since information available indicates that special stocks can be raised well into the 70 and higher octane range.

Such a method, if practicable, may show advantages over thermal reforming or even catalytic reforming, on two counts, a relative disadvantage with respect to one factor. Thermal reforming losses range from 10 per cent to as high as 25 per cent, the figure depending on the degree of improvement obtained, therefore, on the severity of the conditions imposed. Catalytic cracking or reforming losses are lower than by thermal methods but still average higher than those experienced in isomerizing operations so far reported, for which 10 per cent may be considered a fairly high figure. Either catalytic or thermal operating costs over-all are considerably higher than those for isomerization processes. In addition, thermally reformed gasoline is unsuitable for and is out of the picture for aviation fuels.

Heavier From Lighter Products

Isomerization procedures, as will be outlined more in detail later herein, also tend to break up higher-weight molecules into smaller; duodecane is reduced to two hexane molecules, each more highly branched than the original, to an isooctane and a butane molecule; to heptanes, butanes and methane, or pentanes, butanes, propanes and lighter, or any combination of these iso or normal paraffins formed by splitting the longer molecules at various points. The result is to raise the vapor pressure and volatility of the product with small losses and without introduction of olefins which are undesirable in aviation fuels especially. Incidentally some cyclization may occur as part of the isomerization reaction, as will be discussed later.

That isomerization as such may be employed to make improved aviation base stocks is typified by the catalytic neohexane process recently announced by Standard of Indiana. Neohexane,  , has been made for years by Phillips Petroleum Co., by thermal methods involving high pressures of 4,000 lb. or higher and intermediate temperatures. Its synthesis by catalytic means has been studied intensively by several laboratories; now Indiana announces the commercialization of a process, outgrowth or special application of the isomate process, with the $AlCl_3$-HCl catalyst. Neohexane is a clear octane rating of 94-95, high lead susceptibility and high vapor pressure, about 9.5 lb. Reid. It is an especially valuable blending agent for aviation fuel, possessing the three qualities in high degree which are premium for that purpose. A catalytic process for its synthesis should be expected to show lower operating costs and losses than by thermal methods. It found it would provide another valuable method of aviation fuel making. Nothing is known of the details of the synthesis which has been announced as a development of the isomate process already in use.

The details of the process for manufacture of Dixane, an aviation-fuel component, by a process announced by Universal Oil Products Co., recently have not been announced. Presumably this is a catalytic process or possibly a combination of such processes. We are not informed regarding the actual hydrocarbon or group of them which are produced. There is a possibility that this process may have solved the problem of

TABLE 1—Octane Ratings of Several Isoparaffins Compared to Their Normal Isomers

Hydrocarbon—	Octane rating— r = Research method m = Motor method		
	Research	Motor	Blending
n-Pentane (C_5)	62		61.5
Isopentane	92+	90+	99.5r 103.5m
Neopentane	..	83	116r
n-Hexane (C_6)	25	26	29r
3-Methylpentane	..	75	85.5r 80.5m
Neohexane	92	93	97r,m
Diisopropyl	100+	94	96r 106.5m
n-Heptane (C_7)	0	0 (By definition)	0
2,2-Dimethylpentane	..	93	80r
2,2,3-Trimethylbutane (Triptane)	*1.83	*0.07	112.5r,m
n-Octane (C_8)	..	—17	—19r
2,3-Dimethylhexane	71+	79	70.5r 76.0m
2,2,4-Trimethylpentane ("Isooctane")	100	100 (By definition)	100
2,2,3-Trimethylpentane	*1.18	100—	104.5r 111.5m
2,2,3,3-Tetramethylbutane	..	103	130r
n-Nonane (C_9)	..	—45	—34r
2,2,3,3-Tetramethylpentane	..	125	..
3,3,4,4-Tetramethylhexane (C_{10})	..	123	..
"Isododecane" (Mixture; C_{12}'s)	100+	100+	..

*Octane rating equals 100 plus number of cc. TEL mentioned; or, octane rating equals given cc. TEL in c.p. isooctane.

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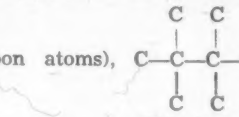
synthesizing triptane, a hydrocarbon having an octane rating somewhat above 100, according to data available. (See Table 1.) Many laboratories have striven to develop a practicable process for its synthesis, since its value to aviation fuel manufacture is potentially tremendous. With above 100-octane number as the practical goal for these fuels now, and with the strong likelihood that the standard requirements will climb both during and certainly after the war, these hydrocarbons and processes for their synthesis assume a position of superimportance.

Reference to Table 1 shows a number of hydrocarbons theoretically and, in some cases already known, practicably producible from normal or slightly branched-chain hydrocarbons. These hydrocarbons include isopentane, 90-92-octane number; neopentane, 83; neohexane and diisopropyl, 92 and 94; motor, or 92 and 100+, Research, respectively; 2,2,3-trimethylbutane (triptane), 100+, along with other more complex higher hydrocarbons, up to about 125-octane number. Octane ratings above 100 are estimated, since no standard is available for testing above that value; customarily these ratings are given as the number of milliliters of tetraethyl lead in isooctane which equals their engine rating.

Because of the complicated structures of some of these higher hydrocarbons, nothing is known as yet as to whether or not they may be produced from simpler molecules by isomerization alone. More probably those like 2,2,3,3,-tetramethylbutane

(eight carbon atoms),



(Diisobutyl)

must be synthesized, as by alkylation of isobutane with isobutane under conditions which will produce this molecule rather than so-called isooctane, 2,2,3-trimethylpentane, which appears to be the preferred reaction under conditions so far employed. In any case, if it appears impossible or impracticable to operate isomerization reactions under such conditions as to form diisobutyl directly, for example, the same reaction will be required to provide isobutane or isobutene as intermediates for its synthesis by alkylation or other methods. The Friedel and Crafts reaction using aluminum chloride or bromide has been and may be used for this purpose; several commercial units are in operation, isomerizing chiefly n-butane. Anhydrous HF is also showing excellent results both as an isomerizing and as alkylating catalyst, with certain advantages and disadvantages for each catalyst.

Editor's note: The second and concluding part of this article will appear next week.

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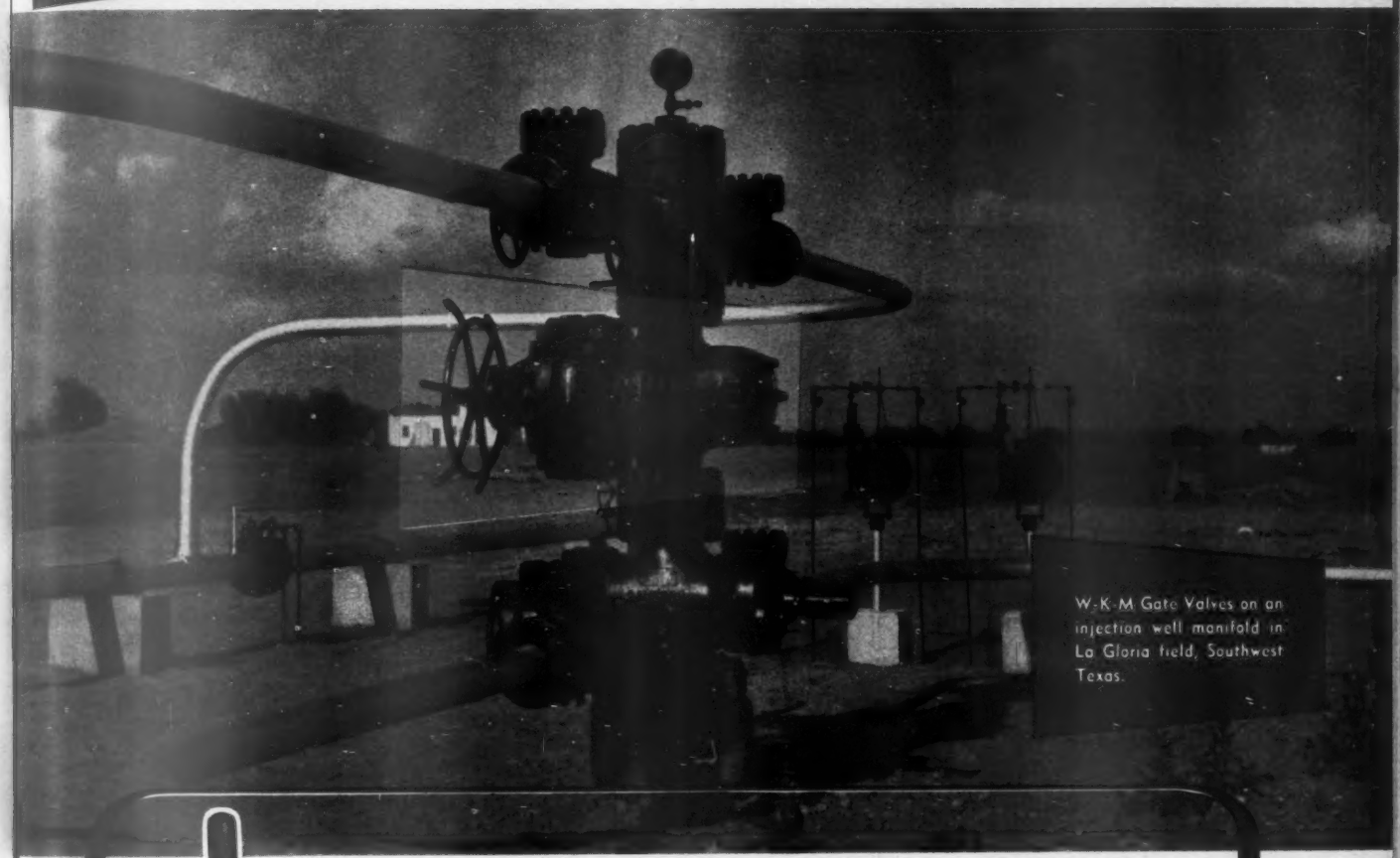

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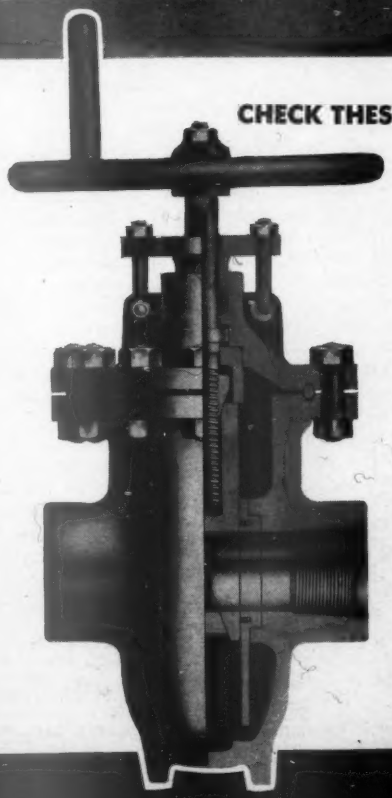

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Polymerization of Butadiene Into Synthetic Rubber

We hear that rubber will not be made in the Mid-Continent region, and that the butadiene made here will be shipped East for making into rubber. We thought that rubber plants were being built here?—P. H. J.

The rubber program as now established consists of three separate and distinct manufacturing operations. The first of these is the manufacture of raw stocks, such as butadiene, styrene, and isobutene; the second comprises the polymerization or copolymerization of these stocks along with subsequent operations into raw rubber or crepe sheet; and the third operation is the compounding, fabricating, etc., that has heretofore been conducted by our rubber companies using natural rubber crepe sheet. From this it can be seen that many of the so-called rubber plants that are being built over the country are really butadiene or styrene plants which will supply these stocks to copolymer plants, none of which has been allocated to the Mid-Continent.

Little information about the polymerization of butadiene and styrene has been disclosed. In part, this is due to the close ring of companies that are to operate copolymerization plants,, but it may also be due to a lack of knowledge of just how this operation will finally be accomplished. In a most general way, butadiene or combinations of butadiene and other raw stocks such as styrene, may be polymerized by heating or by the use of catalysts.

Butadiene polymerizes at the following rates[1] when exposed to sunlight at low temperatures:

32° F.	Negligibly slow
86° F.	0.5 per cent per month
113° F.	1.5 per cent or 3 times as fast as at 86° F.
140° F.	10.5 per cent or 21 times as fast as at 86° F.

This indicates that the rate of polymerization doubles for each 10° to 17° F. increase in temperature in this low-temperature range, but the rate of doubling should not be applied through wider ranges of temperature because polymerization is a bimolecular reaction, a type in which the number of degrees required to double the yield is not a constant. Heating at a temperature of 302° F. converts butadiene into a dimer consisting mainly of 1-ethenyl-3-cyclohexene and a small amount of 1-ethenyl-1 cyclohexene.[2] At 752° F. the reaction[3] is mainly a bimolecular one, such as

$$2C_4H_6 \rightarrow C_8H_{12}$$

but at temperatures up to 1,292° F. both higher-boiling and lower-boiling products are produced which would indicate that decomposition as well as polymerization takes place. In this range the rate of reaction[3] varies with temperature (deg. C. abs.) as follows:

$$\log_{10}k = 7.32 + 6400/T$$

The thermal polymerization reaction just discussed results in nearly all instances in the formation of dimer and thus would not be entirely suitable for the production of the high-molecular weight polymers such as those desired for synthetic rubber.

Numerous catalysts have been mentioned but their action or effectiveness has not been made entirely clear. Certain of the catalysts, such as copper or copper naphthenate (Ref. 4, p. 1116), promote the formation of dimer rather than higher polymers. Metallic sodium has long been used by the Germans and Russians but it is not effective on impure butadiene such as that produced in Russia from petroleum.[4] Diazoaminobenzene is said[4] to be widely used in the Russian synthetic rubber industry. Among other catalysts that have been mentioned are: air,[1 4] copper,[1 4] lead,[1] stannic chloride,[1 4] metallic sodium[1 4] and other alkali metals,[1] alkaline earth metals,[1] amalgams or alloys or these metals,[1] colloidal platinum or mercury or silver or manganese dioxide.[1] boron triflourite,[1 4] barium peroxide,[1] hydrogen peroxide,[1] sodium perborate,[1] ammonium persulfate,[1] organic peroxides,[1] organic peracids,[1] sulfur,[1] starch,[1] oleates of sodium[1] or ammonium[1] or cobalt,[1] sodium stearate,[1] albumen,[1] casein,[1] urea,[1] soap,[1] saponine,[1] glycerin,[1] dioxan,[1] sodium di or triphenylmethyl,[4] aluminum or iron oxide,[4] and aluminum phosphate.[4]

The operation of polymerization may be conducted in pressure reaction vessels lined with hard rubber. One per cent of diazoaminobenzene is used for butadiene derived from petroleum[4] and metallic sodium is used for butadiene from alcohol.[4] Using diazoaminobenzene a temperature of 212° F. and a pressure of 264 lb. per sq. in. absolute is employed whereas a pressure of 55 lb. is adequate with sodium.[4] Under these conditions the rate of polymerization is slow, resulting in a yield of 50 per cent during 6 to 12 days when using diazoaminobenzene.[4] This accounts for the enormous cost of the copolymerization rubber plants,[4] but it should be borne in mind that technical improvements must have occurred during the 7 years since most of the above work was reported. Other references[5] indicate that the polymerization is carried out in a water-soap solution to which inhibitor has been added. The whole is stirred into an emulsion and the emulsion is maintained until polymerization is complete.

The liquid or emulsion produced in the polymerization is similar to the rubber latex liquid encountered in natural-rubber manufacture. The synthetic latex is coagulated by the addition of acidic material and the coagulated synthetic rubber is washed with fresh water and dried. Once polymerization has been accomplished, the operations of coagulation, filtering, washing, drying and compressing into a sheet are common chemical engineering operations and they involve no difficulty. Likewise, the rubber compounding and fabrication operations are well understood by the rubber companies (they have been conducting these operations for years) and some synthetic rubbers are said to be handled with more ease than natural rubber.

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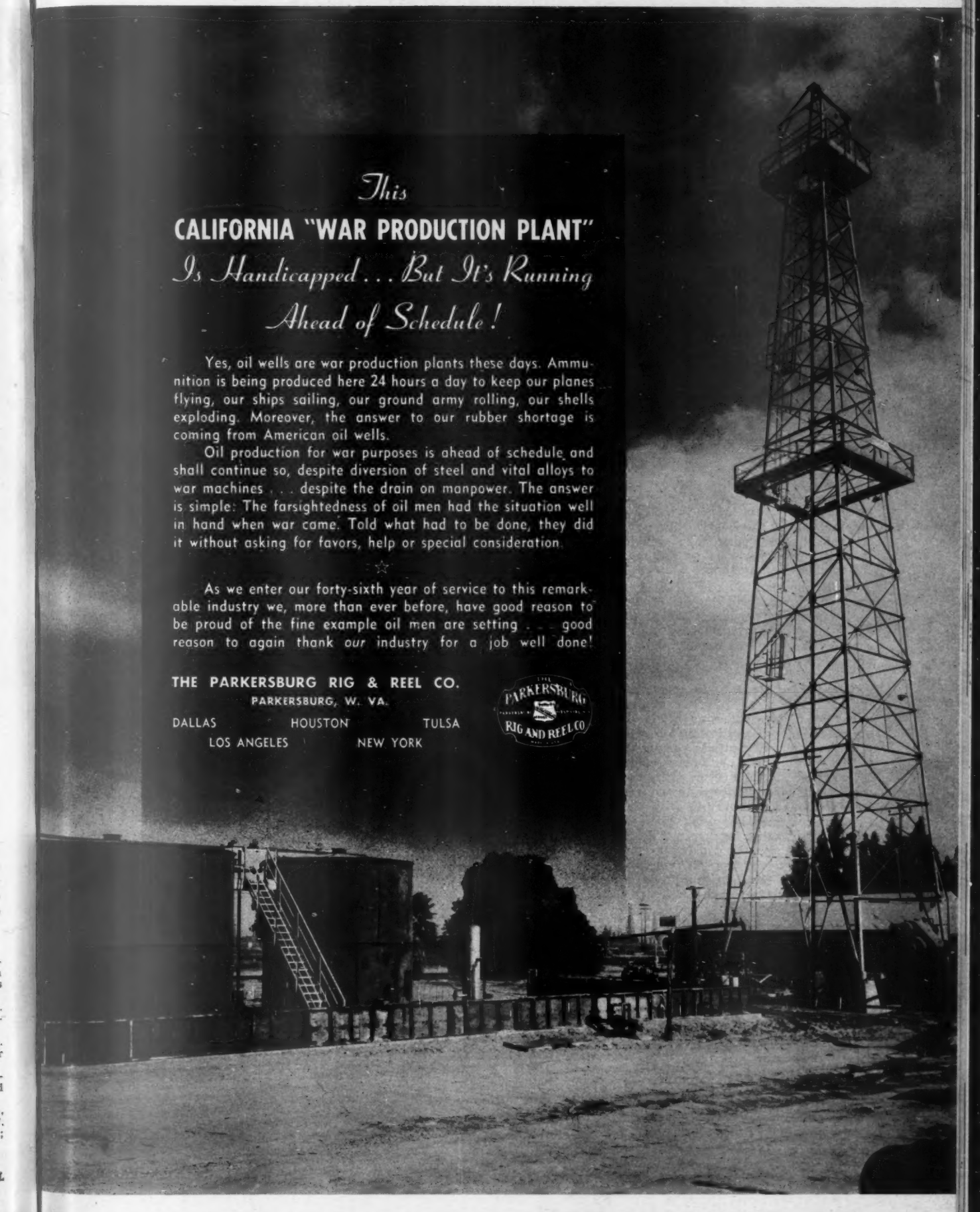
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Preparation of 1,3-Butadiene From Petroleum and Its Fractions*

PART 2

THE apparatus used for pyrolysis of crude oil and its fractions is shown in Fig. 1. It consisted of a furnace and condensation equipment. The furnace was made from a quartz tube (a) of internal diameter 1.7-2.0 cm. Through one end of the quartz tube, a platinum—platinum-rhodium thermocouple passed, kept in a porcelain jacket (j). The buret (b) fitted with a stopcock and used for charging the material under investigation into the furnace was also connected to the same end of the quartz tube. Through the other end of the quartz tube, a brass cooler (c) with running water was passed, serving for rapid chilling of the products of pyrolysis. The products of decomposition were passed into a brass tube (d) embracing the end of the quartz tube, and through the branching tube welded to it the products were passed into the condensation system.

Inside the quartz tube, at a distance of 1.5 cm. from the end of the cooler, a roll of copper gauze (e) 4.5 cm. long was kept filling the entire space of the tube and holding the tip of the thermocouple. The copper gauze was used to effect a uniform distribution of the heat in the heating zone and a possibily low-carbon deposition. The depressing effect of copper on deposition of carbon in pyrolysis was experimentally shown by S. V. Lebedev and A. F. Dobryanskii[9]. The part of the tube occupied by the copper roll was protected by an asbestos stopper and heated with the flame of a Bartell lamp.

The condensation system consisted of a receiver for the tar (r), a condenser with a receiver (f), mercury manometer (u) for indicating the pressure in the system, wash bottle with saturated sodium chloride (k), two absorption tubes with bromine (s), a bottle with alkali for absorbing the bromine vapors (M) and a gasometer not shown in the figure. In the path of the absorbers with bromine, a tube with cotton was included to retain the tar particles entrained in the gas.

The material subjected to pyrolysis was charged dropwise into the furnace and the rate of flow was regulated with the aid of a stop watch within 0.1 to 1.0 ml./min./sq. cm. cross-section of the tube.

The decomposition products were

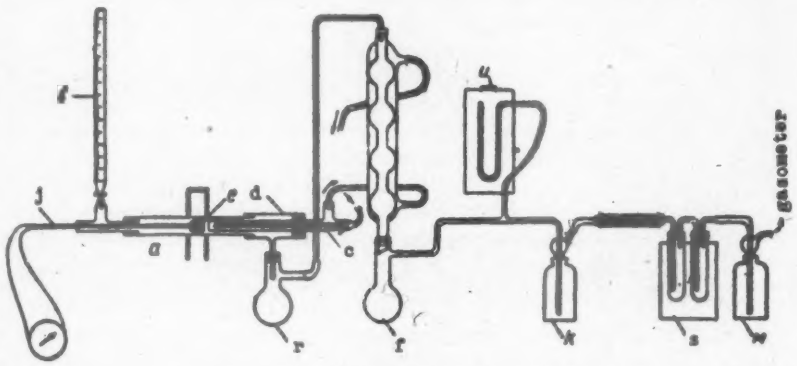

Fig. 1—Setup of the apparatus for pyrolysis

TABLE 1—Mazut

Exp. No.	Decomposition temp., °C.	Rate of flow of mazut, ml. per min. per sq. cm.	Mazut decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	650	0.36	20.0	4.73	69	56	2.05	...
2	650	0.36	20.0	5.00	70	56	2.16	...
3	650	0.36	20.2	4.73	71	56	2.04	2.08
4	700	0.36	20.2	5.80	72	56	2.49	...
5	700	0.36	20.2	6.20	70.5	56	2.65	...
6	700	0.36	20.0	5.68	74	56	2.46	...
7	700	0.36	20.0	6.04	73.5	56	2.62	2.55
8	750	0.36	20.0	5.68	75	56	2.46	...
9	750	0.36	20.0	5.82	71	56	2.53	...
10	750	0.36	20.0	5.74	73	56	2.49	2.49
11	800	0.36	20.0	3.82	74.5	56	1.67	...
12	800	0.36	20.2	4.01	69.5	56	1.76	...
13	800	0.36	20.2	4.14	72	56	1.78	1.73

TABLE 2—Mazut

1	700	1.09	20.0	4.27	71	56	1.85	...
2	700	1.09	20.0	4.18	74	56	1.81	...
3	700	1.09	20.0	4.39	73	56	1.90	...
4	700	1.09	20.0	4.00	72	56	1.77	...
5	700	1.09	20.0	4.18	75	56	1.81	1.83
6	700	0.72	20.0	5.34	74	56	2.30	...
7	700	0.72	20.1	5.63	71	56	2.42	...
8	700	0.72	20.2	5.75	68	56	2.45	...
9	700	0.72	19.8	5.35	73	56	2.34	2.38
10	700	0.36	20.0	5.91	69	56	2.56	...
11	700	0.36	20.0	5.93	73	56	2.57	...
12	700	0.36	20.1	5.95	72	56	2.56	2.56
13	700	0.18	19.9	5.49	73	56	2.38	...
14	700	0.18	20.0	5.54	69	56	2.40	...
15	700	0.18	20.1	5.35	74	56	2.30	2.36

*By S. V. Lebedev, G. M. Kagan, S. V. Katzman, B. D. Kustrya, V. G. Moor, M. P. Ugryumova, G. S. Shantarovich (Chemical Laboratory of the Leningrad University).

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Translated by J. G. Tolpin, Survey of Foreign Petroleum Literature, Universal Oil Products Co., Chicago, Ill.

This translation has been submitted by the Petroleum Division of the American Chemical Society. The Petroleum Division, however, assumes no responsibility for the facts and opinions presented in this article. All data given in the original article are reported in this abstract.

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chilled by the brass cooler through which a rapid stream of water was passed. Further, they passed into the receiver (r) cooled with ice water and passed through the condenser into the second receiver (f), also cooled with ice water. The gas, deprived of its heavy components, was then passed through the bromination tubes connected in series and the components that did not undergo bromination were collected in the gasometer. The latter was constructed to operate on suction and kept in the furnace and the absorption system a residual pressure of 20-30 mm. Hg. The sample of the material pyrolyzed in a single experiment was 20-40 ml.

Pyrolysis of Crude Oil and Its Fractions

Mazut. The mazut sample was obtained from Bibi-Eibat crude by distilling of the kerosene fraction with superheated steam to 250°; specific gravity at 15°, 0.9351; flash point, 152°. The temperature optimum is shown by Table 1 to be about 715°, at which temperature the yield of butadiene on the consumed mazut reaches 2.55 per cent. The results obtained by varying the rate of flow of the mazut are reported in Table 2, showing that the optional rate of flow is 0.36 ml./min./sq. cm. cross-section of the tube. The curves showing the yields of butadiene (Figs. 2 and 3) are based on the data of Tables 1 and 2.

Solar oil. The sample of solar oil used for pyrolysis had a specific gravity at 15° 0.8862; viscosity at 20° 2.54; flash point, 146°. The following data were obtained by distillation of a 150 ml. sample of the oil:

°C.	I.b.p. 275	275-310	310-360	Residue
ml.		38	72	39.5

The effect of the temperature upon the yield of butadiene is shown in

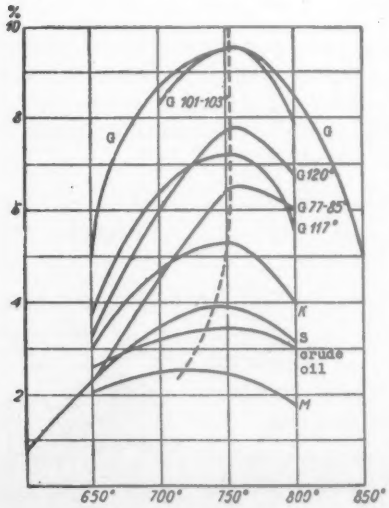

Fig. 2

TABLE 3—Solar Oil

Exp. No.	Decomposition temp., °C.	Rate of flow of solar oil, ml. per min. per sq. cm.	Solar oil decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	600	0.24	40.0	4.01	69	56	0.92	..
2	600	0.24	43.9	3.80	71	56	0.79	0.86
3	650	0.24	30.0	7.99	70	56	2.43	...
4	650	0.24	30.0	8.45	69.5	56	2.57	...
5	650	0.24	30.0	8.09	72	56	2.46	2.48
6	700	0.24	30.0	11.21	71	56	3.41	...
7	700	0.24	22.0	8.77	70.5	56	3.64	...
8	700	0.24	30.0	11.81	73	56	3.60	...
9	700	0.24	27.0	10.5	72	56	3.55	...
10	700	0.24	30.0	11.28	73	56	3.43	3.53
11	750	0.24	30.0	13.09	71	56	3.98	...
12	750	0.24	30.0	12.36	69	56	3.76	...
13	750	0.24	25.0	10.82	72	56	3.95	...
14	750	0.24	30.0	12.99	70	56	3.95	...
15	750	0.24	30.0	12.90	74	56	3.92	3.91
16	800	0.24	27.0	9.73	73	56	3.29	...
17	800	0.24	30.0	10.65	70	56	3.24	...
18	800	0.24	30.0	10.13	72	56	3.08	...
19	800	0.24	30.0	10.62	70.5	56	3.23	...
20	800	0.24	30.0	10.42	70	56	3.17	3.20

TABLE 4—Solar Oil

1	750	0.78	26.0	9.23	71	56	3.24	...
2	750	0.78	25.0	8.49	69	56	3.10	...
3	750	0.78	26.0	8.80	70	56	3.09	...
4	750	0.78	27.0	9.11	71	56	3.18	3.13
5	750	0.48	30.0	10.26	72	56	3.12	...
6	750	0.48	27.0	9.90	75	56	3.35	...
7	750	0.48	30.0	10.65	74	56	3.24	...
8	750	0.48	30.0	11.10	74.5	56	3.38	3.27
9	750	0.16	25.0	10.85	70	56	3.96	...
10	750	0.16	25.0	10.68	70	56	3.90	...
11	750	0.16	25.0	11.39	65.5	56	4.16	...
12	750	0.16	25.0	10.68	74	56	3.90	3.98
13	750	0.12	25.0	9.53	71	56	3.48	...
14	750	0.12	25.0	10.19	74	56	3.72	...
15	750	0.12	25.0	9.61	75	56	3.54	...
16	750	0.12	25.0	10.08	70	56	3.68	3.60

TABLE 5—Kerosene

Exp. No.	Decomposition temp., °C.	Rate of flow of kerosene, ml. per min. per sq. cm.	Kerosene decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	650	0.23	20	5.77	68.0	59.1	2.99	...
2	650	0.23	20	5.89	67.3	59.1	3.05	...
3	650	0.23	20	6.37	65.9	59.1	3.30	3.11
4	700	0.23	20	9.01	67.2	59.1	4.67	...
5	700	0.23	20	9.51	66.0	59.1	4.93	...
6	700	0.23	20	9.27	67.0	59.1	4.80	4.8
7	750	0.23	20	10.30	67.4	59.1	5.33	...
8	750	0.23	20	9.92	68.0	59.1	5.14	...
9	750	0.23	20	10.30	70.1	59.1	5.19	5.22
10	800	0.23	20	7.73	70.1	59.1	4.00	...
11	800	0.23	20	7.46	67.5	59.1	3.86	...
12	800	0.23	20	7.36	66.8	59.1	3.81	3.89

TABLE 6—Kerosene

1	750	0.23	20	10.18	70	59.1	5.27	...
2	750	0.23	20	9.60	68.3	59.1	4.97	...
3	750	0.23	20	10.19	68.5	59.1	5.28	5.17
4	750	0.46	20	10.28	67.7	59.1	5.32	...
5	750	0.46	20	10.20	69.4	59.1	5.28	...
6	750	0.46	20	10.13	65.9	59.1	5.24	5.28
7	750	0.115	20	9.90	71	59.1	5.13	...
8	750	0.115	20	10.00	69.7	59.1	5.18	...
9	750	0.115	20	9.80	68.6	59.1	5.07	5.12
10	750	0.69	20	9.72	69.0	59.1	5.03	...
11	750	0.69	20	9.90	68.8	59.1	5.13	...
12	750	0.69	20	8.50	68.0	59.1	4.40	4.65

TABLE 7—Gasoline

Exp. No.	Decomposition temp., °C.	Rate of flow of gasoline, ml. per min. per sq. cm.	Gasoline decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	650	0.24	40	15.6	67	65	4.94	...
2	650	0.24	40	16.0	68	65	5.07	5.0
3	700	0.24	40	28.0	72	65	8.77	...
4	700	0.24	40	27.6	70	65	8.64	...
5	700	0.24	40	27.0	70.5	65	8.45	8.62
6	750	0.24	40	30.1	70	66	9.50	...
7	750	0.24	40	30.3	73	66	9.57	...
8	750	0.24	40	30.05	71	66	9.50	9.52
9	800	0.24	40	25.0	70	70	8.47	...
10	800	0.24	40	24.5	73	70	8.26	...
11	800	0.24	40	25.2	72	70	8.47	8.4
12	850	0.24	40	17.1	63	62	5.08	...
13	850	0.24	40	16.7	66	62	4.96	5.02

TABLE 8—Gasoline

1	750	0.12	40	25.2	72	66	8.05	...
2	750	0.12	40	24.6	70	66	7.85	7.95
3	750	0.48	40	34.2	72	66	0.89	...
4	750	0.48	40	36.7	68	66	11.28	...
5	750	0.48	40	35.0	71	66	11.08	11.08
6	750	0.96	40	31.0	68	66	9.83	...
7	750	0.96	40	30.0	72	66	9.50	...
8	750	0.96	40	30.4	71	66	9.64	9.66

TABLE 9—Crude Oil

Exp. No.	Decomposition temp., °C.	Rate of flow of oil, ml. per min. per sq. cm.	Oil decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	650	0.22	30	8.56	68.7	57.0	2.63	...
2	650	0.22	30	8.46	70.5	57.0	2.60	...
3	650	0.22	30	8.17	66.2	57.0	2.51	2.58
4	700	0.22	30	10.61	65.6	57.6	3.26	...
5	700	0.22	30	10.58	70.0	57.6	3.25	...
6	700	0.22	30	10.71	67.5	57.6	3.29	3.27
7	750	0.22	30	11.74	71.5	57.0	3.60	...
8	750	0.22	30	11.46	64.0	57.0	3.52	...
9	750	0.22	30	11.99	69.4	57.0	3.68	...
10	750	0.22	30	11.77	70.0	57.0	3.62	3.60
11	800	0.22	30	9.46	71.0	58.3	2.97	...
12	800	0.22	30	9.97	71.0	58.3	3.13	...
13	800	0.22	30	9.88	66.7	58.3	3.10	3.07

TABLE 10—Crude Oil

1	750	0.84	30	11.03	68.0	57	3.39	...
2	750	0.84	30	11.38	69.0	57	3.45	...
3	750	0.43	30	12.24	70.5	57	3.76	...
4	750	0.43	30	12.31	66.5	57	3.78	...
5	750	0.43	30	11.92	68.8	57	3.66	3.73
6	750	0.22	30	....	70.2	57	3.60	3.60
7	750	0.11	30	11.01	66.4	57	3.38	...
8	750	0.11	30	10.71	67.1	57	3.29	3.34

TABLE 11—Fraction 77°-85°

Exp. No.	Decomposition temp., °C.	Rate of flow of gasoline, ml. per min. per sq. cm.	Gasoline decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	650	0.22	30	4.71	72	67.8	2.30	...
2	650	0.22	30	4.82	73	67.8	2.34	...
3	650	0.22	30	4.84	73	67.8	2.26	2.23
4	700	0.22	30	9.53	72	67.8	4.40	...
5	700	0.22	30	9.66	74	67.8	4.50	...
6	700	0.22	30	9.71	73	67.8	4.52	4.47
7	750	0.22	30	14.09	74	67.8	6.56	...
8	750	0.22	30	14.04	72	67.8	6.53	...
9	750	0.22	30	13.98	71	67.8	6.51	...
10	750	0.22	30	14.01	72	67.8	6.52	6.53
11	800	0.22	30	12.74	72	67.8	5.94	...
12	800	0.22	30	12.90	71	67.8	6.01	...
13	800	0.22	30	13.86	73	67.8	5.99	5.98

Table 3, revealing a temperature optimum at about 735°. At 750°, the yield amounts to 3.91 per cent.

The results of the experiments on determination of the dependence of the yields of butadiene on the rate of flow of solar oil are shown in Table 4. The optimal velocity is 0.16 to 0.24 ml./min./sq. cm. cross-section of the tube. These data are graphically shown in Figs. 2 and 3.

Kerosene. The kerosene sample had a specific gravity at 15° of 0.8247. Engler distillation data for it follow:

°C.	Per cent
120-150	3.5
150-170	8.4
170-190	17.6
190-210	8.1
210-230	21.0
230-250	17.3
250-270	8.9
270-290	6.8
290-300	4.6
Residue and losses	3.8

Table 5 contains data on the yields of butadiene, depending upon the temperature. At the optimal temperature of 750°, 5.22 per cent butadiene on the decomposed kerosene is obtained. The experiments performed to determine the optimal rate of flow are shown in Table 6, indicating that the optimal velocity is 0.46 ml./min./sq. cm. cross-section of the tube. The curves pertaining to these experiments are shown in Figs. 2 and 3.

Gasoline. Baku gasoline Grade 2 of specific gravity at 15° 0.7495 was used for pyrolysis. Its Engler distillation gave the following figures:

°C.	Per cent
35-80	0.4
80-85	1.2
85-90	18.2
95-100	20.0
100-105	15.1
105-110	7.8
110-115	4.3
115-120	2.0
120-125	1.3
125-129	0.9
Residue	1.0

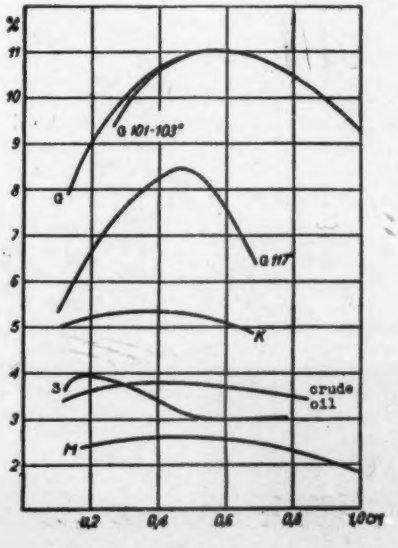

Fig. 3

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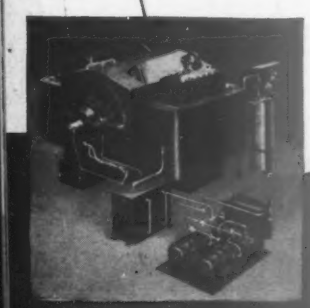

TRI CLAD

TABLE 12—Fraction 77°-85°

Exp. No.	Decomposition temp., °C.	Rate of flow of gasoline, ml. per min. per sq. cm.	Gasoline decomposed, ml.	Bromides obtained g.	Melting point of the crude bromides °C.	Content of the tetrabromide of 1,3-butadiene in the crude bromides, per cent	Yield of 1,3-butadiene, per cent	Average yield of 1,3-butadiene, per cent
1	750	0.11	30	13.02	73	67.8	6.07	
2	750	0.11	30	13.05	74	67.8	6.08	6.08
3	750	0.44	30	16.17	72	67.8	7.54	...
4	750	0.44	30	16.04	74	67.8	7.46	
5	750	0.44	30	16.14	74	67.8	7.47	7.50
6	750	0.66	30	11.94	75	67.8	5.57	...
7	750	0.66	30	11.99	76	67.8	5.59	
8	750	0.66	30	11.86	75	67.8	5.53	5.53

TABLE 13—Fraction 101°-103°

1	700	0.24	40	25.6	69	65.5	8.19	
2	700	0.24	40	25.6	71	65.5	8.41	8.3
3	750	0.24	40	29.8	71	65.5	9.50	...
4	750	0.24	40	30.5	70	65.5	9.72	
5	750	0.24	40	30.2	71	65.5	9.62	9.6
6	800	0.24	40	24.6	72	65.5	7.86	...
7	800	0.24	40	24.2	70	65.5	7.73	7.8

TABLE 14—Fraction 101°-103°

1	750	0.48	40	34.8	72	65.5	11.10	
2	750	0.48	40	34.4	71	65.5	11.00	11.0
3	750	0.96	40	30.8	71	65.5	9.83	...
4	750	0.96	40	30.0	71	65.5	9.56	9.7

TABLE 15—Fraction 117°

1	650	0.22	40.0	10.97	75	71	3.71	...
2	650	0.22	40.0	12.32	76	71	4.14	...
3	650	0.22	40.0	11.64	74	71	3.89	...
4	650	0.22	40.6	11.19	75	71	3.76	3.87
5	700	0.22	40.0	19.03	75	71	6.44	...
6	700	0.22	40.6	20.02	74	71	6.67	...
7	700	0.22	40.0	18.75	75	71	6.40	
8	700	0.22	40.0	19.25	75	71	6.52	6.52
9	750	0.22	40.0	21.15	72	71	7.18	...
10	750	0.22	40.0	21.53	74	71	7.29	...
11	750	0.22	40.0	21.21	70	71	7.18	...
12	750	0.22	41.2	22.70	74	71	7.46	7.30
13	750	0.22	40.0	21.69	72	71	7.35	...
14	800	0.22	40.0	16.39	74	71	5.48	...
15	800	0.22	40.0	16.29	72	71	5.45	...
16	800	0.22	40.0	15.07	70	71	5.37	...
17	800	0.22	40.0	15.97	73	71	5.34	5.41

TABLE 16—Fraction 117°

1	750	0.11	30	14.38	73	71	6.50	...
2	750	0.11	30	14.48	74	71	6.55	6.59
3	750	0.44	40	24.61	72	71	8.34	...
4	750	0.44	40	14.74	74	71	8.38	
5	750	0.44	40	24.81	74	71	8.40	8.37
6	750	0.66	30	14.10	73	71	6.38	...
7	750	0.66	30	14.17	73	71	6.40	...
8	750	0.66	30	14.19	76	71	6.40	6.39

TABLE 17—Fraction 120.6°

1	650	0.22	30	7.60	75	69	3.23	...
2	650	0.22	30	7.66	76	69	3.31	...
3	650	0.22	30	7.74	76	69	3.33	3.24
4	700	0.22	30	13.24	75	69	5.73	...
5	700	0.22	30	13.35	74	69	5.78	...
6	700	0.22	30	13.41	73	69	5.80	5.77
7	750	0.22	30	17.60	72	69	7.62	...
8	750	0.22	30	17.86	70	69	7.73	...
9	750	0.22	30	18.01	73	69	7.80	...
10	750	0.22	30	18.02	72	69	7.80	7.74
11	800	0.22	30	15.44	72	69	6.69	...
12	800	0.22	30	15.54	74	69	6.74	...
13	800	0.22	30	15.64	73	69	6.76	6.73

TABLE 18—Fraction 120.6°

1	750	0.11	30	14.53	73	69	6.25	...
2	750	0.11	30	14.42	73	69	6.20	6.27
3	750	0.44	30	17.09	74	69	7.40	...
4	750	0.44	30	17.10	75	69	7.40	...
5	750	0.44	30	17.17	75	69	7.44	7.41
6	750	0.66	30	15.26	74	69	6.61	...
7	750	0.66	30	15.86	74	69	6.81	...
8	750	0.66	30	15.38	73	69	6.66	6.69

Considerable yields of butadiene, reaching 11 per cent at the optimal temperature and rate of flow, are obtainable, as seen from Tables 7 and 8. The dependence of the yields of butadiene upon temperature and rate of flow of the gasoline is also graphically shown in Figs. 2 and 3. The optimal temperature is 750° and the optimal rate of flow 0.48 ml./min./sq. cm. cross-section of the tube.

Crude oil. Bibi-Eibat crude oil was used for pyrolysis of specific gravity at 15° 0.8952; viscosity, 4.68; flash point, 42.5°. Engler distillation of this oil gave the following figures:

°C.	Per cent
141-161	1.6
161-171	1.2
171-181	2.5
181-191	2.8
191-201	3.6
201-211	2.7
211-221	2.6
221-231	2.3
231-241	4.0
241-251	2.8
251-261	3.2
261-271	1.8
271-281	4.0
281-291	4.6
291-301	1.0
301-311	2.8
311-321	2.4
321-331	2.6
331-341	4.4
341-351	4.9
Residue	42

The effect of the temperature and rate of flow on the yield of butadiene is shown in Tables 9 and 10 and Figs. 2 and 3. It is seen that the highest yields, 3.73 per cent on the consumed oil, are obtained at 750° and that the optimal rate of flow is 0.43 ml./min./sq. cm. cross-section of the tube.

Pyrolysis of gasoline fractions. The following fractions were used for pyrolysis experiments:

°C.	d_{15}
77-85	0.7036
101-103	0.7364
117	0.7599
120.6	0.7707

The first two fractions were obtained by repeated fractionation of Baku gasoline Grade 2 under a 1 m. laboratory column packed with glass rods and a two-bulb dephlegmator. The fractions boiling at 117° and at 120.6° were obtained by distillation of Baku gasoline Grade 3 under a Savalle column.

The low specific gravity of the fraction 77°-85° indicates a considerable content of paraffins in addition to cyclohexane. The Tables 11-18 reveal that the highest yields (up to 11 per cent) of butadiene were obtainable from the fraction 101°-103°. The optimal temperature for all gasoline fractions is 750°. The optimal rate of flow for all gasoline fractions is about 0.45 ml./min./sq. cm. cross-section of the tube.

Editor's Note: This is the second and concluding installment of this article. The first installment appeared in the issue of February 11.

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Determining Capacity of Reciprocating Steam Pumps

by W. L. Nelson

THE capacity of a regular duplex double-acting reciprocating steam pump is equal to about half of the product of the stroke (inches) and the square of the diameter (inches) of the liquid cylinder. For simplex pumps the capacity is about half as much as the above — or is equal to about one-fourth of the product of the stroke and the square of the cylinder diameter. Finally, belt or gear-reduction-driven pumps of either the duplex or triplex types have a capacity about 1½ times greater (factor is 0.75) than that of the regular duplex.

These statements or rules may be summarized as:

Gal./min. regular duplex ½ D^2S or 0.5 D^2S
Gal./min. simplex ¼ D^2S or 0.25 D^2S
Gal./min. belt or gear-driven cylinders (duplex and triplex) ¾ D^2S or 0.75 D^2S

in which

D is the diameter of the liquid cylinder or plunger in inches.

S is the length of stroke in inches.

Steam pumps are widely used in refineries because of their "foolproof" nature and the fact that they will operate in some fashion even though in poor repair. They are shifted about from service to service and it is therefore important to be able to estimate quickly their capacity without recourse to tables, handbooks, etc.

Example 1.—The capacity of a 6 by 4 by 6 general-service duplex pump is about half of 16 times 6 or 48 g.p.m.

$$\frac{1}{2} \times 4^2 \times 6 = 16/2 \times 6 = 48$$

For a simplex pump the capacity would be only about half as much or a little less than 24 g.p.m.

If this pump (or liquid cylinder) was driven by a belt or by gear reduction the capacity would be 1.5 times larger or about 72 g.p.m.

Derivation of Relationship

There is no theory underlying the above relationship except to evaluate the constants, namely 0.5 for regular pumps, 0.25 for simplex pumps and 0.75 for belt or gear-driven pump cylinders. A comparison of capacities computed by this rule and the recommended capacities of pump manufacturers are given in Tables 1 to 4 inclusive.

In determining the capacity of duplex reciprocating pumps, the following statement should be remembered:

The gallons per minute from a duplex pump is about equal to half of the stroke times square of the diameter.

TABLE 1
Simplex Boiler Feed or General Service

Pump size—	Capacity, g.p.m. Max.	Normal	Computed
4 by 2½ by 5	14.8	11.4	7.8
4½ by 2¾ by 6	15.6	12.0	11.4
6½ by 4 by 8	50.7	39.0	32.0
10 by 6 by 8	146.0	88.0	108.0
14 by 8 by 12	261.0	157.0	192.0

TABLE 2
Simplex Low-Pressure Service

Pump size—	Capacity, g.p.m. Max.	Normal	Computed
3½ by 3½ by 4	22.0	17.0	12.3
5½ by 5½ by 7	70.0	54.0	57.0
8 by 8 by 12	204.0	157.0	194.0
12 by 12 by 12	478.0	352.0	432.0

TABLE 3
Duplex, Many Types

Pump size—	Capacity, g.p.m. Max.	Normal	Computed
3 by 2 by 3	13.1	11.2	6.0
4½ by 2¾ by 4	30.0	21.0	15.2
4½ by 3¾ by 4	50.0	35.0	28.2
6 by 3 by 6	...	29.0	27.0
5¼ by 3½ by 5	58.0	37.0	31.0
7½ by 3½ by 8	80.0	49.0	49.0
10 by 4 by 10	85.0	65.0	80.0
10 by 4½ by 12	123.0	99.0	122.0
7½ by 4½ by 10	132.0	97.0	102.0
9 by 5¼ by 10	180.0	131.0	138.0
7½ by 7 by 10	350.0	240.0	245.0
9 by 8½ by 10	440.0	295.0	360.0
12 by 8½ by 12	601.0	506.0	436.0
7 by 8 by 18	640.0	508.0	575.0
12 by 11 by 12	840.0	700.0	727.0

TABLE 4
Triplex Plunger Pumps

Pump size—	Capacity, g.p.m. Max.	Normal	Computed
1¼ by 2	4.12	2.75	2.34
1¾ by 2½	9.36	5.85	5.75
2 by 3	13.60	9.15	9.0
3 by 4	45.0	28.0	27.0
4 by 6	90.0	75.0	72.0
6 by 6	250.0	173.0	162.0
6 by 8	200.0	190.0	216.0
8 by 6	448.0	309.0	288.0

It will be noted that the computed values do not check the catalog values exactly, the computed values being somewhat low for small pumps and somewhat large for the large pumps. It should be recalled, however, that steam pumps can operate at a wide range of capacity—a range extending from about 10 to over 130 per cent of the normal working capacity; hence the failure of this rule to work with extreme accuracy is not of great importance.

Finally, in the interest of long trouble-free operation it is wise to operate steam pumps at slower speeds than those given in catalogs, particularly the small-size pumps which are rated in many pump catalogs for 90 to even 130 s.p.m. Thus, it would be wise to consider the capacities computed by these rules as maximum capacities, and if possible to operate pumps at somewhat lower capacities.

Air-Drive Experiments

(Continued from Page 64)

further increase in pressure.

4. Approximately 50 per cent recovery may be expected from a core initially 100 per cent saturated with oil. There is a small variation in this amount depending on the characteristics of the sand.

5. Constant high-pressure maintenance is shown to lead to a greater recovery than is obtained by a gradual stepwise increase in pressure. However, the relative difference is not as marked as in experiments using radial cores.

No Increased Ultimate Recovery

6. Gas drive, although more advantageous from the viewpoint of lack of oxidation and less advantageous from the viewpoint of cost, did not result in any increased ultimate recovery when compared with air drive at the same pressure.

7. Relative permeability to methane as function of per cent oil saturation is the same as the relative permeability to air as a function of oil saturation.

8. Water drive following air drive showed a remarkable increase in recovery. The possibilities of the use of water drive following air drive deserves further laboratory study as well as field experimentation.

9. One experiment though insufficient indicates that air drive followed by water drive may be more efficient in ultimate recovery than an original water drive.

10. The presence of connate water in the sand may quantitatively affect the results of 8 and 9 and, therefore, these experiments should be repeated to determine what effect connate water has on the results.

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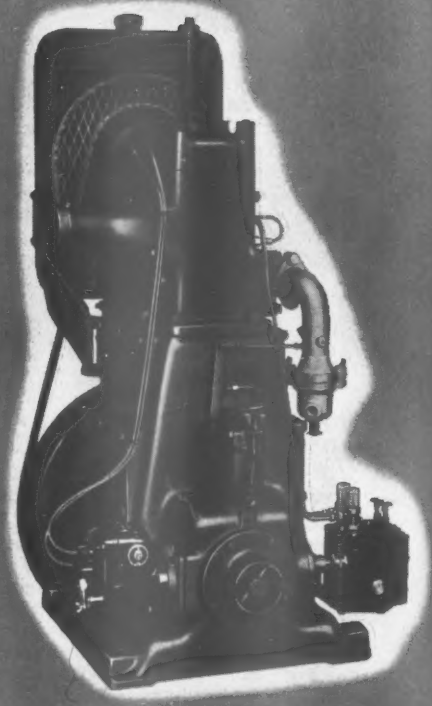
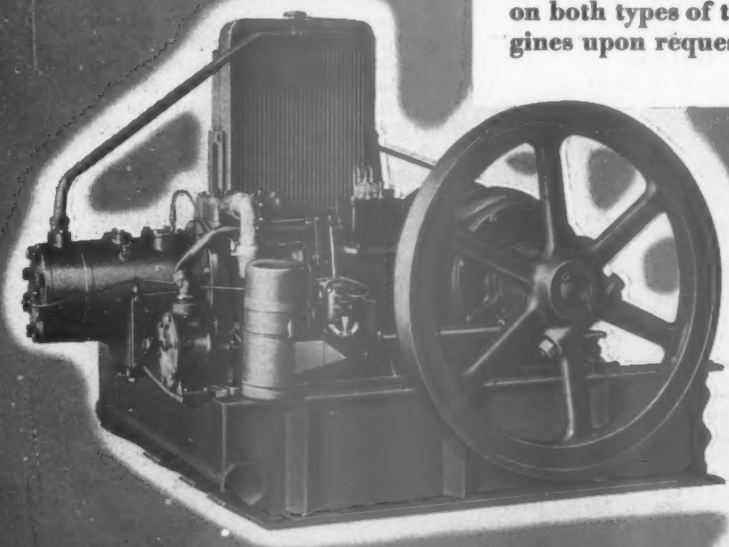


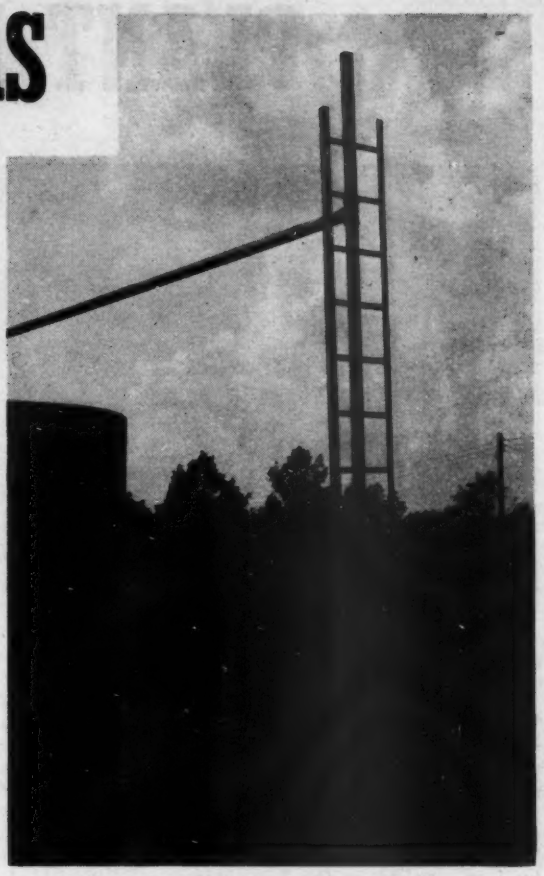


TYPE EM

OPERATING IDEAS

Guy-Line Anchors for Rotary Drilling Mast

AN effective means of anchoring the guy lines of the mast of this portable rotary drilling rig is provided with two sections of 8⅝-in. or 10-in. pipe that are set up vertically at the front end of the drilling floor, one on each side. Plates welded on the bottom ends of the sections as bases make possible the bolting of the pipe securely to heavy timbers under the floor. The guy lines are fastened to the top ends of weighted sections of pipe, slightly smaller in diameter than the two anchor posts. Dropped inside the anchor posts, these weighted pipe sections hold the guy lines tightly. Much time is saved in tearing down or setting up.



Salvable Ladder for Gas Flare

THE ladder to the flare on a battery of tanks is not used frequently, but is usually considered a necessary part of the lease equipment. One producer in Louisiana constructs these light ladders from perforated angles and straps, bolting them together with usual spacing of the rounds, and attaching the unit to the flare standpipe with U-bolts through the proper holes in two of the rounds. This ladder requires much less metal than the one built up from pipe, and when the need for it has passed, it may be dismantled and the component parts used where needed. Spacing of the rounds is adjustable.

Mud Pits Made From Old Storage Tank

FOR mud pits on a rotary drilling rig operating in a townlot area, the contractor makes use of three rings of an old 250-bbl. storage tank. Each ring serves as a pit. The lower ring already had a bottom. Each of the other two rings was fitted with a bottom from old sheet metal. The tanks are connected with flumes which fit through openings in the tops of the tanks, and through which the mud flows from one tank to another. These are removable and adjustable.

PLANT PRACTICES

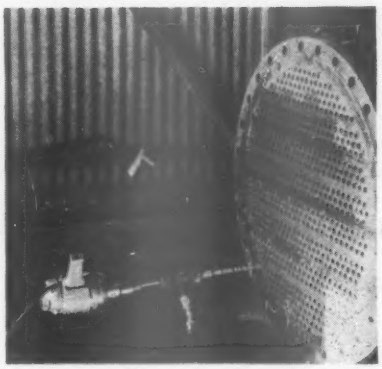
Gas Torch and Rack

A HOMEMADE gas torch is constructed by swaging the end of a ¾-in. by 30-in. pipe to an orifice of approximately 3/32 in. A 6-in. or 8-in. section of 2-in. pipe is swaged down and welded to the orifice end of the smaller pipe just back of the orifice. Two or more slots, approximately ¼ by 1 in. are cut in the 2-in. pipe at regular intervals around it, approximately opposite the orifice. The size of the orifice is governed by the pressure of the gas supply. A flexible hose connection is made to the opposite end of the ¾-in. pipe for the gas supply. The rack is made of any light scrap material such as guy rod, with the notch as illustrated at the desired height. At rear the vertical post is fitted with short horizontal bars on which the torch handle may be rested at various levels. The long handle enables the operator to do the work beyond reach of heat. The torch is useful for removing grease and muck from equipment for preheating and tinning bearing shells and numerous other shop tasks requiring heat.

Safety Grinder Assembly

A GRINDER and a buffer are mounted on opposite ends of a 12 or 15-in. light truck rear axle section and bearing assembly. The bearings including those near the wheel end of the axle, and their retaining housing section. A section of ¼ or ½-in. sheet steel rises vertically from the cutaway end of a vertical section of 6 or 8-in. pipe fixed rigidly in the floor, the sheet being fitted to one end of the axle housing section. A second piece of sheet extends horizontally from the vertical pipe to a point below the other end of the housing, bends at right angles and is fitted to the housing in a manner similar to the first piece, giving a two-point support to the axle-bearing assembly. The motor is supported on a sheet of the required size held by two straps welded to the vertical pipe stand as shown. A V-belt pulley is fitted on the axle shaft for driving the unit.

Flusher-Cleaner for Exchanger Tubes



A REGULAR tube cleaner is fitted to an electric hand drill with a water-flushing attachment as shown. A 3-in. section of pipe is slipped over the hollow drill stem, this sleeve being larger than the drill stem to leave an annular space between stem and sleeve. Packing glands are fitted to each end of the sleeve, and a short tee of the desired size of pipe is welded into the middle point of the sleeve and a water hose connection fitted to this tee. The hollow drill stem is drilled with a few holes, ⅛-in. or less, in the section covered by the sleeve to allow water from the tee connection to pass into the stem and out through the cutter head, to flush cuttings out of the tube ahead of the drill. Collars may be fitted to the drill stem fore and aft the sleeve to hold it in place. The packing glands need to be kept merely tight enough to prevent water leakage and rotation of the sleeve is prevented by the resistance of the hose attached to the tee connection.

DRILLING ECONOMIES RESULTING FROM MULTIPLE COMPLETIONS

SAVINGS made possible by a multiple-zone well completion as compared with the costs of drilling single wells to the separate producing zones in an area having several productive horizons are obtained in many ways. In a previous issue the savings resulting from the reduced steel requirements for a multiple-zone well completion were discussed. Other economies are effected in actual drilling costs through reduced drilling time and savings in drilling equipment, and by savings in costs of preparing well locations.

The saving in actual drilling cost and drilling equipment is in direct relationship to the number of separate wells that do not have to be drilled. As far as actual drilling is concerned, a well intended for a multiple-zone completion requires no more time or cost than a single-zone well. Some additional time and cost is involved during completion but this generally is negligible compared with the time required for drilling an additional well.

Time and Rig Costs

Factors in a multiple-zone completion that add to the time and rig costs for such a well include the additional precautions necessary in cementing to insure complete separation of the various productive zones behind the casing, perforating casing in the additional horizons and setting of packers to seal off the separate zones inside the casing. Adequate cementing in a multiple-zone completion often necessitates squeeze jobs requiring additional perforating and pumping of cement. Such practices, however, are often followed in completing of single-zone well completions, particularly the Gulf Coast and in other areas where deep sands and high pressures are concerned.

As in the case of steel requirements, the savings in drilling time and rig costs of a multiple-zone completion vary according to the depths of the wells involved, the interval between the productive zones, and also to a large extent upon formations and drilling conditions in the particular area involved. Generally speaking, the savings in deep drilling are proportionately greater than in shallow wells. In turn, when the interval between the productive zones is comparatively narrow, the saving is much greater proportionately than when the upper horizons are considerably shallower than the lower pay. Also if formations are hard and drilling slow, the saving would be much greater than in areas where drilling is easy and wells can be put down rapidly. In other words, the extent of savings to be realized by a multiple-zone well completion from the standpoint of drilling costs is dependent upon the ease and rapidity with which additional individual wells can be drilled to the various productive zones. In some instances it is possible the savings might not be sufficient to overbalance the disadvantages of a multiple-zone completion.

Costs of operating a rig, however, are such that any reduced rig time in development of an area is a major savings. As a multiple-zone well completion gives the equivalent of two producing wells for the drilling of one well, the reduction in operation of a rig by the elimination of the extra wells, if they were permitted at this time, is a factor to be considered in the development of a multiple-zone area. This is particularly important at this time in view of the need for saving of drilling equipment. By reduction in number of wells to be drilled, drilling equipment is conserved with major economies to the operator.

Also to be considered in the savings effected by multiple-zone well completions are the costs of preparing locations for wells. The costs of building roads to locations, and, in the case of swamp or marsh locations, dredging canals or providing other means of access, often constitute a sizable item. On the Gulf Coast this cost runs into the thousands of dollars in many cases. In addition, there are the costs of mud pits, the providing of derricks, and the moving in and setting up of rigs for each well, all of which costs are materially reduced by multiple-zone well completions.

Production

In listing the factors affecting savings to be derived from completing wells in more than one productive horizon as compared with the costs of drilling separate wells to the respective horizons, no consideration is given to the production advantages to be gained from the practice. There are two schools of thought on this. One holds that producing a well from more than one horizon will involve so many problems, particularly in the later stages of production, that the initial savings in the actual completion will not be justified. The other contends that the operation of a multiple-zone well will entail no particularly difficult problems, and that the actual operation of such a well will be less costly than that of separate wells. Since reliable data on the effectiveness of multiple-zone production is limited so far to the earlier stages of well production there is as yet little upon which to base any definite conclusions. The main point at this time, however, is that since multiple drilling is not permitted in most instances, multiple-zone completions now offer the only means of developing several producing horizons in any new area.

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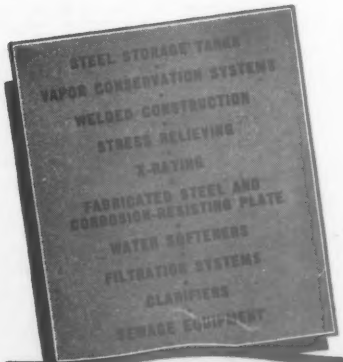

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Engineering Fundamentals

No. 71

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

DETERMINATION OF HUMIDITY

RELATIVE humidity was defined in Installment 70 of this series. In determining the amount of water vapor contained in air or any gas, the measurement is not commonly made directly. The determination generally consists of measuring the relative humidity with a hygrometer or psychrometer, calculating the maximum water vapor content possible at the given pressure and temperature, and then obtaining the actual water vapor content by multiplying the relative humidity times the maximum possible water vapor content.

The simplest form of instrument for determining relative humidity of air is the sling psychrometer illustrated in Fig. 1. It consists of two

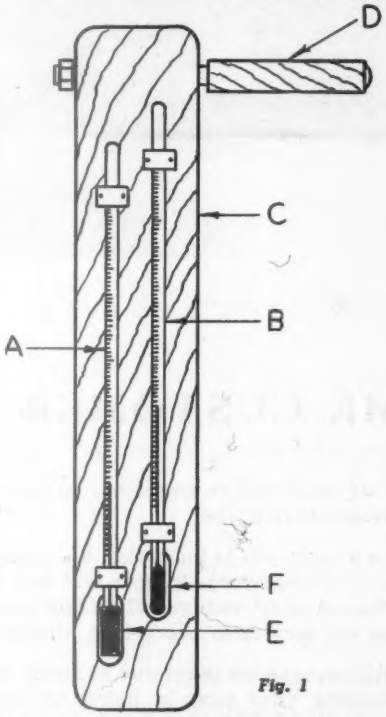


Fig. 1

thermometers (A and B) mounted on a piece of wood (C) which is fitted with a rotatable handle (D) so that the whole instrument can be whirled. Holes (E and F) are provided in the wood frame adjacent to the bulbs of the two thermometers so that air will come in intimate contact with the bulbs as the instrument is whirled. Thermometer (A) has the bulb wrapped with a piece of clean cotton cloth which is kept wet with water while whirling to determine the humidity. This thermometer is called the **wet bulb thermometer.** The **dry bulb thermometer** (B) is an ordinary thermometer which measures the actual temperature of the air. This instrument gives an indication of the relative humidity due to the drop in temperature of the wet bulb thermometer that is caused by evaporation of the water on its bulb. Such drop in temperature varies with the rate of water evaporation, which in turn is inversely proportional to the relative humidity of the air. So if the psychrometer is whirled at a fast enough rate (15 ft. per second or more is recommended as the velocity of the thermometer bulbs), the relative humidity may be calculated or read from a psychrometric chart or table. Table 1 is suitable for such use when dealing with air at a barometric pressure of 14.7 lb. per sq. in. and using a sling psychrometer.

The cloth used on the wet bulb should be of cotton that has been boiled to remove all sizing or grease. Distilled water should be used for wetting the cloth so that the pores will not be clogged by impurities. The cloth should be changed occasionally because of foreign matter that it will collect in use.

A dew point hygrometer may be used to measure the moisture content of air or gas. This instrument consists essentially of a polished metal surface the temperature of which can be controlled. The temperature of the surface that causes dew to form on it, as compared to the temperature of the gas is a measure of the humidity of the gas.*

Another relatively simple method of determining humidity consists of passing a measured volume of the gas or air through a drying agent and determining, by accurate weighing, the increase in weight due to collection of moisture.

*Such an apparatus, suitable for use with natural gas at pressures up to 2,500 lb. per sq. in., is described by Deaton and Frost in R.I. 3399 of the U. S. Bureau of Mines.

Example 1

Problem: Air at a temperature of 95° F. is found by experiment to have a wet bulb temperature of 80° F. Barometer reading is 14.2 lb. per sq. in.

(a) What is the relative humidity?

(b) What is the absolute humidity of the air, in pounds per pound of dry air?

Solution: (a) From Table 1, it is found that the relative humidity is 52.5 per cent.

(b) From Table 1 of Installment 31, the vapor pressure of water at 95° F. is 0.8152 lb. per sq. in.

Then the volumetric fraction of water vapor in the air, according to the principle of partial pressures discussed in Installment 70, is $\frac{0.8152}{14.2}$ × 0.525 or 0.0301.

Now take 100 mols of the wet air as a basis. Then, 100 mols of the wet air would contain 0.0301 × 100, or 3.01 mols of water vapor and (100 — 3.01), or 96.99 mols of dry air.*

The weight of water present, then, is the volume taken as a basis is 3.01 × 18,† or 54.18 lb.

And, the weight of dry air present is 96.99 × 28.8,‡ or 2,793.3 lb.

Then, the absolute humidity is $\frac{54.18}{2,793.3}$, or 0.194 lb. per lb. of dry air.

*This involves the assumption that water vapor will behave as a perfect gas, since mol per cent is used as equivalent to volume per cent. This assumption causes no appreciable error in problems of this sort.

†The molecular weight of water is 18.

‡The molecular weight of air is 28.8. See Installment 57.

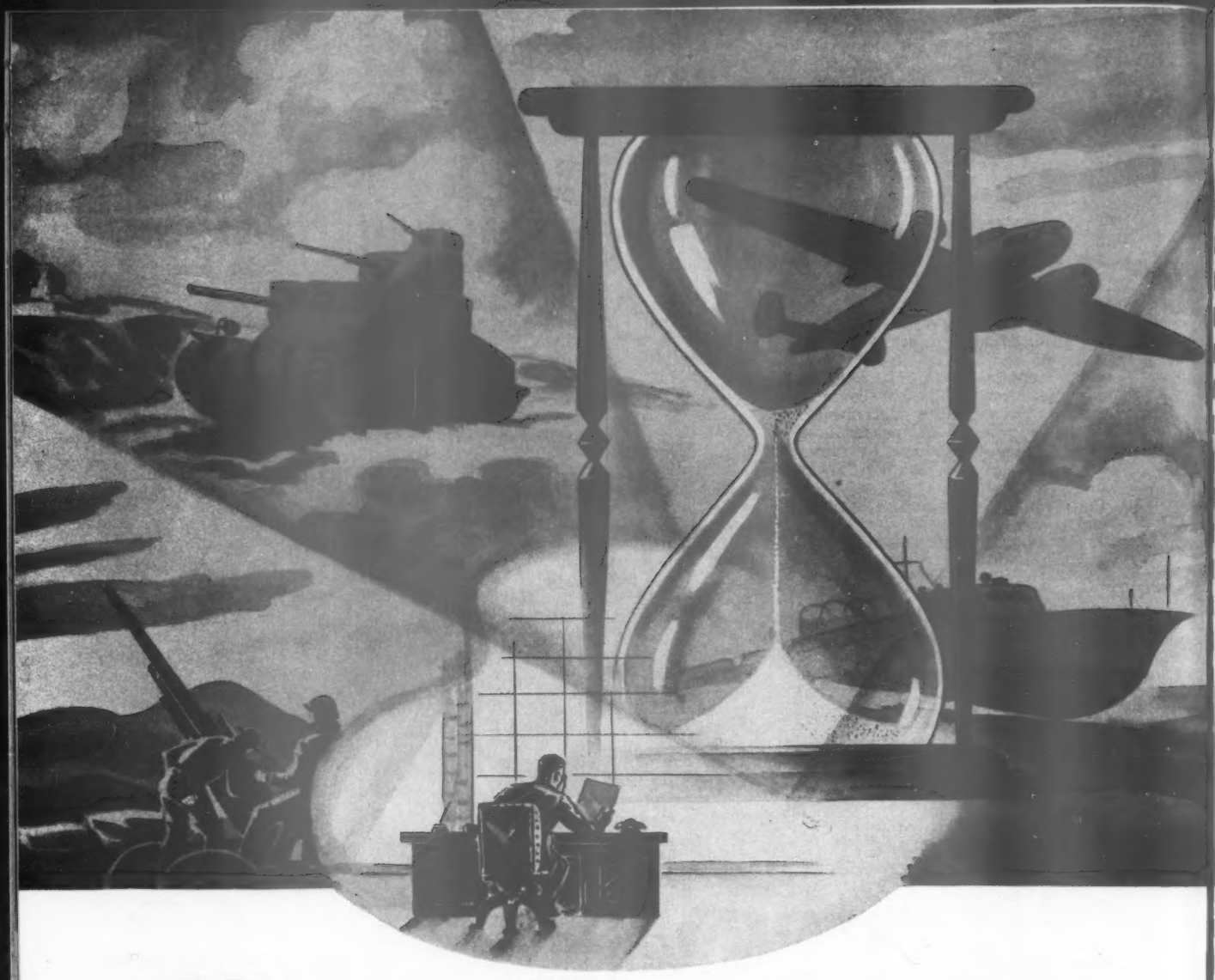
TABLE 1—Relative Humidity

Values are percentage of humidity at a barometric pressure of 29.92 in. of mercury; based on readings obtained from wet and dry bulb thermometers which are ventilated by moving air. Intermediate values can be interpolated.

Dry bulb, °F.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
100	96	93	90	86	83	80	77	74	71	68	65	62	59	57	54	52	49
90	96	92	89	85	81	78	75	71	68	65	62	59	56	53	50	47	44
80	96	91	87	83	79	76	72	68	64	61	57	54	51	47	44	41	38
70	95	90	86	81	77	72	68	64	60	56	52	48	44	40	37	33	30
60	94	89	84	78	73	68	63	58	53	49	44	40	35	31	27	22	18
55	94	88	82	76	71	65	60	55	49	44	39	34	29	25	20	15	11
50	93	87	81	74	68	62	56	50	44	39	33	28	22	17	12	7	2
45	93	86	79	71	65	58	52	45	39	33	26	20	14	8	2	..	..
40	92	84	76	68	61	53	46	38	31	23	16	9	2	..	..	..	..
35	91	82	73	64	55	46	37	29	20	12	4	..	..	..	..	..	..

From "Natural Gas Handbook," by Diehl, Metric Metal Works, 1934.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma



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. . . Because we want you to remember us just as we are remembering you.

. . . Because we want you to know that the closing shot of this all-important struggle will find us back at the old stand, ready, willing and eager to resume our service to peace-time friends.

. . . Above all, because we want you to know that we appreciate your part in lifting us from obscurity to leadership in the field of oil-industry pumps — and plan to repay you with post-war pumps that reflect the expanded facilities and broadened experience of war-time operation . . . Gaso Pump & Burner Mfg. Co., 902 E. First Street, Tulsa, Oklahoma. Export Office: 149 Broadway, New York. Los Angeles: Service Oil Field Supply Co., 5333 S. Riverside Drive.

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Journalog

No. 27

A FEATURE OF THE OIL AND GAS JOURNAL

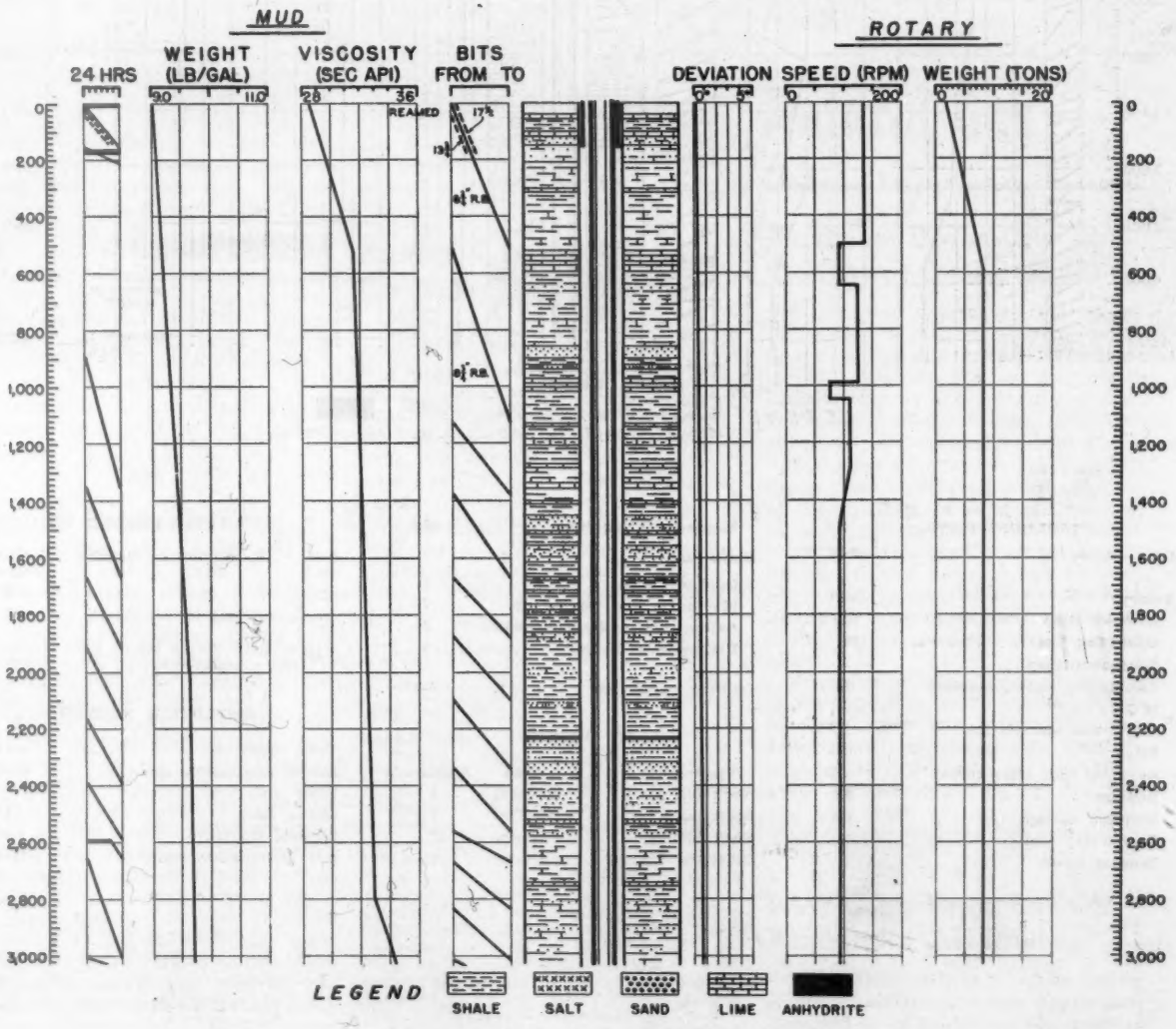
TEXAS PACIFIC COAL & OIL CO. 12 S. H. HILL AC. 1

1,495 ft. from south line and 330 ft. from east line of Section 1122, T.E.&L. Survey, Stephens County, Texas. Located 2½ miles southwest of Eliasville, Tex., and in southwest end of Eliasville pool. Derrick floor elevation 1,135 ft.

CONTRACTOR

JEROME McLESTER
FORT WORTH, TEX.

Discovery Well of Mississippi Lime Production in Eliasville Field, Stephens County, Texas



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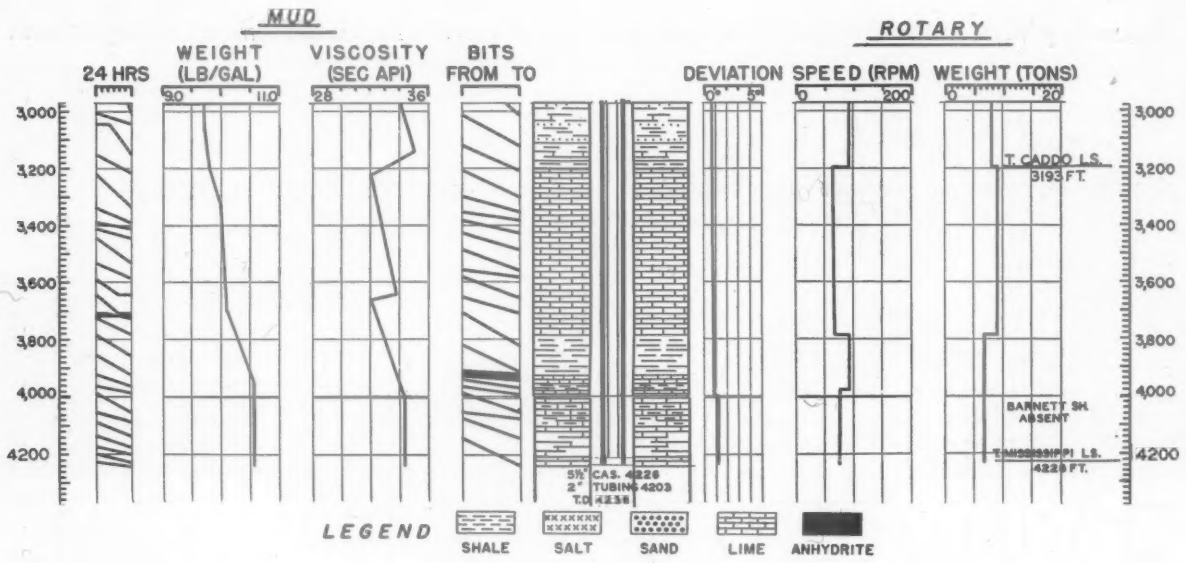
A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Discovery Well of Mississippi Lime Production in Eliasville Field, Stephens County, Texas



DRILLING DATA

Date started	11-29-42

Rotary:	Days
Over-all time	46
Operating time	38
Shutdown time	1
Circulating, cores, reaming	1
W.O.C.	5
D.S.T. and electric log	1
Trips	4.5
Reaming (not after cores)	1.2
Repairs	2.8
Running casing	0.6
Connecting well	1
Tearing down	1
Elapsed drilling time	23.5

Cable tools:	
Over-all time	8
Moving in and rigging up	2
Bailing and drilling cement	3
Drilling and testing	3

Drilling completed	1-6-43

BIT RECORD

Type—	Size	Number
Rock bit	17½-in.	1
Rock bit	13¾-in.	1
Rock bit	8¾-in.	37
Corehead	6¼-in.	2

CASING RECORD

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
10	40	153 5/8	170
5½	17 & 20	4,226½	460

(2-in. EUE tubing set at 4,203 ft. for well completion)

COMPLETION RECORD

Total depth (ft.)	4,236
Initial production (bbl.)	503.25
Time (hr.)	5
Choke (in.)	1½
Electric log (ft.)	4,236
Date completion test	1-31-43

Natural Gasoline

Absorption Plant to Be Erected at Pauls Valley

Announcement has been made that the Pure Oil Co., the Texas Co., Mid-Continent Petroleum Corp. and Anderson-Prichard Oil Corp. have signed a contract with Otha H. Grimes, natural gasoline manufacturer of Tulsa, by which Grimes will erect a 5,000,000-cu. ft. absorption gasoline plant on the Jackson lease in the Pauls Valley pool of Garvin County, Oklahoma.

Grimes stated that the plant would process the high pressure gas coming from both the Pennsylvania and Ordovician formations in the pool, and produce high-test natural gasoline, butane and propane, and dispose of the dry residual gas to the Lone Star Gas Co.

Application for the unit was made early in November, 1942, but it was only recently approved by the War Production Board. Basic part of the plant will be an idle plant Grimes owns in Michigan to be dismantled and shipped to Pauls Valley.

It is estimated that it will take 3 months to build and get the plant in operation.

Gasoline Contracted For Western Butadiene Plant

LOS ANGELES, Calif. — Rubber Reserve Corp. has completed negotiations for the purchase of 24,000 bbl. per day of gasoline to be delivered to Southern California Gas Co.'s unit of the butadiene plant under construction in southern California and the Los Angeles city council this week voted to grant the Defense Plant Corp. permission to lay a pipe line in a number of Los Angeles city streets for the transmission of butylene and other hydrocarbons required in the manufacture of synthetic rubber. The Defense Plant Corp. is erecting the necessary distillation units and will also lay the necessary pipe to connect up the various units. After construction the project will be operated by Southern California Gas Co., Shell Chemical Co., Dow Chemical Co. and Goodyear Tire & Rubber Co. as agents for the Rubber Reserve Co. In order to supply the synthetic rubber plant with water and power, the Los Angeles city council voted to annex 300 acres of land adjacent to south Figueroa Street in the San Pedro area so that the necessary water and power may be delivered. The Department of Water and Power will begin soon laying a 24-in. water main to the new plant to supply 20 second-feet of water and will also install the necessary wires to deliver 25,000 kw.-hr. of electricity. This annexation was voted to facilitate work on the plant which will be operated by Shell Chemical Co., Dow Chemical Co. and Goodyear Tire & Rubber Co. Two plants are under construction in California for the production of synthetic rubber, one to be operated by Shell Chemical and the other to be operated by Southern California Gas Co. Dow Chemical Co. will produce the styrene the second necessary component of synthetic rubber.

Natural Gasoline Output Continues Upward Trend

WASHINGTON, D. C.—Daily average production of natural gasoline and allied products increased to 242,000 bbl., in December, according to a summary issued last week by the Bureau of Mines. Average output for the year was 229,000 bbl. daily, an increase of 7,000 bbl. over 1941 operations.

Outstanding increases in December occurred in the Texas Panhandle, California and Louisiana.

Another reduction in stocks was reported. Inventories declined from 209,832,000 gal. at the end of November to 194,544,000 gal. on December 31. Most of the December decrease occurred in practically all producing states, Ohio, West Virginia, Louisiana and Arkansas being exceptions.

(Thousands of gallons)

	Production			
	Dec. 1942	Nov. 1942	Jan.-Dec. 1942	Jan.-Dec. 1941*
W. New York	2	1	15	17
Pennsylvania	1,678	1,475	15,529	16,011
W. Virginia	10,323	9,279	98,997	98,044
Ohio	536	439	6,311	8,217
Illinois	13,329	13,009	140,235	93,165
Kentucky	3,846	3,278	29,435	35,371
Michigan	110	135	2,312	5,670
Kansas	7,692	7,335	78,956	85,691
Oklahoma	38,497	37,633	446,427	453,383
Texas	139,868	133,925	1,586,772	1,558,819
Arkansas	3,549	3,738	41,926	34,389
Louisiana	27,918	26,223	299,720	225,724
New Mexico	7,346	7,336	86,678	81,000
Colorado	35	35	289	390
Montana	514	421	4,514	3,966
Wyoming	3,281	3,265	36,288	36,288
California	57,148	53,025	635,410	659,765
Total	315,672	300,552	3,500,814	3,395,910
Dy. ave.	10,183	10,018	9,616	9,304
Total (thousands of bbl.)	7,516	7,156	83,567	80,855
Dy. ave.	242	239	229	222

*Final figures.

Daily average production of liquefied petroleum gas, including liquefied refinery gas, reached a new high in December, totaling 335,832,000 gal., including 170,058,000 gal. of natural gasoline; 57,834,000 gal. of cycle products; 10,332,000 gal. of isobutane at natural gasoline and cycle plants; 77,448,000 gal. of liquefied petroleum gas at natural gasoline and cycle plants and 20,160,000 gal. of liquefied refinery gas at refineries.

Demand for natural gasoline and related products totaled 350,406,000 gal. in December, an increase of 15,498,000 gal. over November and nearly 8,000,000 gal. greater than December 1941.

Natural Gas

Maximum Use of Critical Manpower Sought by I.G.T.

A two-point program to make maximum use of critical scientific manpower in the gas-industry technical-training program will go into effect immediately at the Institute of Gas Technology, affiliated with Illinois Institute of Technology in Chicago.

Technical students are scheduled to begin their regular training program at the institute in June but because so many colleges are operating under wartime accelerated programs, graduation dates of the new fellows vary considerably. At least two of the new institute appointees will complete their regular college training in March.

Provision is being made under the new program to make maximum use of these extra man hours. The new fellows will be assigned to institute war-research projects as rapidly as they complete their college training and will work at this activity until their regular training program starts.

PAW Considering Ban On Panhandle Gas Drilling

WASHINGTON, D. C.—The Petroleum Administration for War is understood to be preparing an order to prohibit the drilling of additional gas wells in the Panhandle field on the ground that production from existing wells is ample to fill all present transportation facilities. A similar order is already in effect in the Hugoton field.

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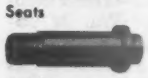

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REFINING

Wright Gary to Discuss Catalysis at Tulsa

Catalysts and catalytic processes will be discussed by Wright W. Gary, president of Filtrol Corp. of Los Angeles, Calif., before the Western Petroleum Refiners Association at the Mayo Hotel, Tulsa, Friday, February 26, beginning at 2 p.m.

Presentation of this subject is prompted by the rapid increase in the use of catalysts in refining processes and the greatly increased importance of catalysis in a greater number of refinery operations. Mr. Gary is an authority on refining technology and engineering and was for many years associated with research, development and plant applications of refining processes with the M. W. Kellogg Co. of New York. During 1941-42 he was director of the Refining Division, Office of Petroleum Coordinator, in Washington (now Petroleum Administration for War). He resigned from that position to accept the presidency of the Filtrol Corp.

Because of secrecy and censorship restrictions no written paper can be presented or distributed. A round-table discussion open to all in attendance at the meeting will follow Mr. Gary's talk.

Phillips Petroleum Co. Adopts 48-Hour Week

BARTLESVILLE, Okla. — A work week of 48 hours has been adopted by Phillips Petroleum Co., effective March 1, according to an announcement by Frank Phillips, chairman of the board, and K. S. Adams, president. With some exceptions, all employes will go on the longer week, and those employes subject to the Fair Labor Standards Act will be paid time and one-half for all hours over 40 hours per week. Adjustments will be made in the pay of other employes who may be required to work longer hours than they are now working.

Most Nebraska Production To Be Refined Within State

OMAHA, Neb.—Former Gov. Arthur J. Weaver, representing three Nebraska refineries, has secured an order from the supply and distribution committee of PAW preventing producers in Nebraska fields from shipping most of the state's crude output out of the state and into Minneapolis refineries. Skelly Oil Co. has already received this order and the Ohio

Sketches of Plant Operators

HERBERT S. CHASE, formerly general superintendent of Tide Water Associated Oil Co.'s refinery at Bayonne, N. J., last week was appointed manager of manufacturing of the company's eastern division with headquarters at New York.

The new manager of manufacturing has been with Tide Water Associated since 1922. He is a graduate of Harvard University and has wide experience in refining operations.

B. I. Graves, vice president of Tide Water, who announced appointment of Mr. Chase to the managerial position also said that George C. Caine has been made superintendent of the Bayonne refinery. Mr. Caine is a graduate of Massachusetts Institute of Technology and, since 1938, he has been assistant general superintendent at the Bayonne plant. He joined Tide Water in 1926 as a member of the research and development department.

Oil Co. is awaiting a similar directive. The Mid-States refinery at Falls City, the Nebraska Producing & Refining Co. at Salem, and the Searle Refining Co. of Omaha protested that they were greatly hampered in their operations by the export of Nebraska crude. The committee's memorandum states that Minneapolis refineries require some Nebraska crude, estimated at 500 bbl. daily, because of the high sulfur content of Wyoming crudes but that all other shipments of Nebraska crude to Minnesapolis are being stopped.

What's Going On At the Plants

Blowing Still Installed

PRODUCERS Refining, Inc., West Branch, Mich., has added a 1,000-bbl. blowing still at its refinery for use in connection with vacuum refining equipment. The plant has daily capacity of 3,500 bbl. and includes an asphalt unit. C. G. Miller is refinery superintendent and H. B. Martin is assistant.

Codimer, B-B Plants

A GAS concentration unit for recovery of butane and butylene from crude and cracking stock has been completed at the Denver, Colo., refinery of the Bay Petroleum Co. The company is also building a codimer unit at its McPherson, Kans., refinery. The company's Denver plant has capacity of 4,000 bbl. of crude daily and an 1,800-bbl. cracking plant. Capacity of the McPherson refinery is 5,500 bbl. of crude daily and 2,500 bbl. of cracking stock.

Recovery Unit Finished

CONSTRUCTION has been completed on a gas-recovery unit at the Phillipsburg, Kans., refinery of the Cooperative Refinery Association. New facilities installed last year are capable of removing all the C_4 fractions from crude and cracking stocks and current recovery of these fractions totals about 25 bbl. daily. The Phillipsburg plant has crude capacity of 3,500 bbl. daily and a 630-bbl. cracking unit.

Extensive Expansion

CROWN CENTRAL Petroleum Corp., Baltimore, Md., operator of a 16,000-bbl. refinery on the Houston, Tex., ship channel, has an extensive expansion program under way. The company is constructing a catalytic cracker, alkylation and isomerization units and is installing auxiliary equipment for the production of 100-octane gasoline and butylenes for the manufacture of synthetic rubber. K. W. Shimeall is general manager of refining operations and R. S. Myers is refinery superintendent.

OPA Removes Service Ceiling on Aviation Fuel

WASHINGTON, D. C.—Prices for services rendered by oil companies in storing and distributing aviation gasoline for the Army and Navy may be determined through agreement between the oil companies and the service departments, the OPA announced February 10.

The prices must be reported to the OPA within 10 days of the agreement, and if they are not disapproved or modified by OPA within 30 days, they will be accepted as maximum prices.

Provision for a speedy and flexible method of determining maximum prices for these services was made necessary, OPA said, by a change in the program for supplying the armed forces with high-octane gasoline, defined as gasoline with 87-octane rating or higher. The provision is made in Amendment 108 to Supplementary Regulation 14, general maximum-price regulation.

Formerly the War and Navy departments bought high-octane aviation gasoline on the basis of specified delivered prices, but under the new program refineries sell the gasoline at refinery points to the government-owned Defense Supplies Corp. and the DSC sells it to the War and Navy departments.

"The life and soul of science is its practical application."
— *Lord Kelvin*

1778 — 1829
Sir Humphry Davy is probably best known for his inquiry into the nature of explosive gases and of flame, which led to the construction of his miner's safety lamp.

Davy also was a co-worker with other physicists in the experiments which led to the incontrovertible theory that mechanical energy and heat were reciprocally convertible.

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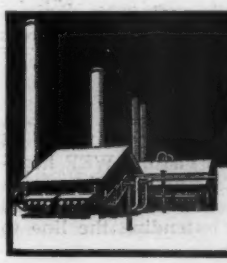

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PIPE LINES

WEP Sends First Tank-Car Train From Norris City

Following a brief dedication ceremony held near one of the loading racks at Norris City, Ill., February 19 the first train load of crude oil from the War Emergency Pipelines, Inc., terminal started for an East Coast destination. The departure of this 95-car train carrying crude oil pumped to Norris City from Longview, Tex., represents the initial step in having the system function to serve war needs.

Elsewhere in this issue are presented the dedicatory address of Petroleum Administrator Harold L. Ickes and an article by Henry D. Ralph describing the manner in which the transportation business of the WEP system will be transacted.

Dedication

After an address by Deputy Petroleum Administrator Ralph K. Davies, W. Alton Jones, president of War Emergency Pipelines, Inc., acknowledged receipt of the citation presented to his organization. George H. Hill, vice president, Defense Supplies Corp., commented on the cooperation of the oil industry with the government which had made this project possible. The ceremony was concluded by brief remarks of commendation by B. E. Hull, general manager of WEP, on what had been accomplished by the construction organizations in completing the line.

Loading facilities at Norris City consist of three double-track racks capable of loading a maximum of 1,200 cars per day. This differs from previous reports. It will be several weeks before the line is operating at full capacity. At the first of this week, four main line stations were in operation, No. 1, 5, 7 and 9a. Delays in starting other stations are owing to difficulties in obtaining certain essential equipment.

Williams Brothers Corp. is engaged in laying a second 24-in. line across the Mississippi River.

Heltzel Visits Line

This week William G. Heltzel, Tulsa, vice president of Stanolind Pipe Line Co., is visiting WEP headquarters at Cincinnati, Ohio. He will observe construction operations under way for extending the line to the East Coast.

In the discussions arising as a result of a plea of Midwest refiners that the eastern leg of the WEP 20-in. products line be built before the southwestern leg, pipe line executives in different parts of the country have commented on the fact that, from an operating standpoint, it is more practical to load tank cars from a pipe line than to feed a pipe line from tank cars. Furthermore, numerous difficulties are presented in constructing the 20-in. on sections of the right-of-way where the 24-in. line is still under construction.

Great Lakes Buys Refiners' Cushing-Barnsdall Line

Great Lakes Pipe Line Co. is completing arrangements for buying the 60-mile 6-in. line built last fall between Cushing and Barnsdall, Okla. This was a joint enterprise undertaken by Tide Water Associated Oil Co., Deep Rock Oil Corp., Cushing Refining & Gasoline Co. and Johnson Oil Refining Co. interests for moving products from their refineries at Cushing, Drumright and Cleveland to the Great Lakes trunk line. Construction of the line was supervised by the Tide Water organization. With the line, Great Lakes acquires four small pump stations, one at each refinery.

The work of removing booster-station equipment and reinstalling it at other locations on the Great Lakes system will be completed about the first of March. For carrying out this program, electric-centrifugal pumping equipment has been moved from idle stations to increase capacity of the system at points northeast of Kansas City, Mo.

Republic Buys Hugoton Pipe Line Right-of-Way

Purchase of right-of-way for a new gas pipe line from the Guymon sector, Oklahoma, to near Hugoton, Kans., in the Hugoton gas field has started. C. F. Seagraves, of Republic Natural Gas Co. is directing the work. Survey for the line was being completed by W. B. Crawford, engineer of Hugoton.

The 16-in., 18-mile line will connect on the Ferguson, Ebersole and Hempsten leases, southwest of Guymon, ex-

tending north to 3 miles east of Hugoton, to connect with a trunk system. About a year ago the Republic built 22 miles of lines in the Oklahoma sector of the field.

South Texas Project Is Being Discussed

A project for laying a new line from McMullen and La Salle counties, Texas, to a Gulf Coast refining center is under consideration, according to reports. The new line would parallel lines of United Gas Pipe Line Co. which will be converted to crude oil service; it would serve new pools being opened along the upper Wilcox trend.

Wisconsin Pipe Lines Impeded by New Obstacles

MADISON, Wis. — Great Lakes dock interests, railroad brotherhoods, coke-plant employes and solid-fuel dealers last week led in support of a bill apparently designed to obstruct introduction of natural gas in Wisconsin at a state Senate committee hearing here.

The measure, identical with a measure introduced in the Wisconsin assembly by William F. Double, Milwaukee, originated in the upper house with the committee on state and local government.

It not only would require any public utility furnishing gas to obtain a certificate of public convenience and necessity from the Wisconsin Public Service Commission before substituting natural gas "or a mixture of natural gas" but provides that even after such a certificate is issued municipalities shall have the right to determine whether or not they would use it when made available.

"No public utility furnishing and selling gaseous fuel to the public shall change the character or kind of such fuel," the bill says, "by substituting for manufactured gas any natural gas or any mixture of natural and manufactured gas for distribution and sale in any town, village or city unless the municipal council thereof shall . . . authorize same."

Philip H. Porter, former member of the Public Service Commission legal staff, appeared for the bill as counsel for the Lake Michigan Dock Association. While natural gas is a valuable natural resource and "a high grade, easy-to-handle, desirable fuel," he said, its quantity is limited and a pipe line from the southwest, he added, would be a "slim lifeline" and a big investment. He also pointed out that Wisconsin's many lake docks wouldn't handle so much coal and many men would be thrown out of work if natural gas were admitted to the state.

Representatives of the brotherhoods and fuel dealers said natural gas would "upset" employment and the fuel business and counsel for Wisconsin railroads said his organization took a "selfish but necessary" position in supporting the measure.

Numerous manufactured gas companies in Wisconsin have testified to the advantages of natural gas and of their desire to make connections with natural gas pipe lines which have been proposed for serving cities in the state.

Woodsfield Authorized To Remove Gathering Lines

Permission has been granted by the Texas Railroad Commission to Woodsfield Pipe Line Co. for removing the company's gathering system in the Samfordyce field, Hidalgo County, Texas. As soon as sale of the pipe has been completed the system will be dug up.

Bill to Forbid Conversion Of WEP to Gas Service

Gov. Sam Jones of Louisiana recently endorsed a bill introduced in Congress by Senator O'Daniel of Texas which would require dismantling after the war of any oil pipe line which is converted to the purpose of transporting natural gas.

Governor Jones said he was urging Louisiana's congressmen to aid Texas in supporting the bill. Two of the largest gas-producing states, Louisiana and Texas, are attempting to conserve their gas supplies.

War Oil Shipments Affected by Ruling

Because of the increasing war demand, Petroleum Administration for War has issued Regulation 1, which provides a method of governing the delivery or receipt of petroleum and its products.

It implements the authority already conferred by executive Order 9276, and is designed to avoid the need for formal orders in rare individual cases where it is necessary to direct immediate action to meet local emergencies. The new rule provides the means of overriding any contract to which the person addressed is a party, and also overriding any general petroleum regulation, PAW order, petroleum distribution order or directive.

The new order, Ralph K. Davies, deputy administrator, said, was necessary to "achieve the maximum flexibility in the wartime coordination of petroleum supply and demand."

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46 BPH at 1120 lbs.
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3" to 6" x 6" V-Belt or Direct
68 BPH at 767 lbs.
288 BPH at 181 lbs.

2½" to 5" x 10" Direct Drive
59 BPH at 1325 lbs.
278 BPH at 330 lbs.

2½" to 7" x 10" Direct Drive
92 BPH at 920 lbs.
557 BPH at 168 lbs.

2½" to 5" x 10" V-Belt
59 BPH at 1400 lbs.
278 BPH at 405 lbs.

3" to 7" x 10" V-Belt
92 BPH at 1203 lbs.
557 BPH at 202 lbs.

2½" to 7" x 10" V-Belt
92 BPH at 1400 lbs.
557 BPH at 303 lbs.

3" to 8" x 10" V-Belt
92 BPH at 1400 lbs.
733 BPH at 230 lbs.

TRIPLEX

3" to 5¾" x 8" V-Belt Drive
156 BPH at 1605 lbs.
631 BPH at 396 lbs.

QUINTUPLEX

2½" to 4" x 6" V-Belt
199 BPH at 1500 lbs.
555 BPH at 600 lbs.

3" to 5¾" x 8" V-Belt
260 BPH at 1605 lbs.
1050 BPH at 396 lbs.

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Exploration and Drilling

Week's Highlights

MANY signs point to the location of the next big play in the Rocky Mountain and northern plains areas. Since the Illinois basin development, there have been four leasing campaigns in interior districts, the Forest City basin, northern Mississippi, western Nebraska and the Dakotas. The four campaigns combined resulted in only one major field, Tinsley. The Nebraska and Dakota plays were hampered by a lack of knowledge of geological conditions, particularly along the Cambridge arch and in the eastern part of the Williston basin. Much preliminary drilling had to be done in order to determine the existence of potential pay horizons preliminary to drilling on structures. Failure of wildcat wells to show much in the way of productive possibilities does not indicate that these areas have no such possibilities. It merely shows the need for a prolonged period of accumulation of geological data before the real search for oil can commence.

Normally, more effective results can be obtained by pushing out from known productive areas and the Nebraska-Dakota area has good possibilities along this line. The showings found in the Pennsylvanian on the Las Animas uplift in western Kansas and the Horse Creek discovery in Southeast Wyoming suggest a connection through the western part of Nebraska. Gradual pushing of production northward into the Salina basin of North Central Kansas may be expected to work along the east flank of the Cambridge arch into Central Nebraska, and, as on the west flank, later Paleozoic formations appear to offer better chances for success than the deeper pays.

The success of the search for Tensleep production in the Elk Basin field, on the Wyoming-Montana state line coupled with the increased demand for black oil turns attention again to the basins of the Rocky Mountain area whose oil possibilities have been a topic of discussion for many years. More than 420 miles to the south, the Uinta basin of eastern Utah and western Colorado is another center of interest as a well drilled primarily for magnesium salts appears to have discovered a new oil field in Pennsylvanian sands at comparatively shallow depths (p. 118).

Recently some major companies have established new headquarters in the Rocky Mountain area, and there has been a continual expansion of staffs of companies already in the district. The potential area is very large, being some 50 per cent wider and 200 per cent longer than the West Texas Permian basin. Structures are sharper, particularly in the western portion, making geophysical and geological prospecting simpler than in many areas now active. The western part of the district is closer to the Pacific Coast where there is an increasing demand for oil and dwindling supplies than other areas capable of furnishing relief. The headwaters of the Columbia and Colorado river systems enter the region providing potential routes for pipe-line transportation.

SOUTHWEST TEXAS: Reklaw production has been found in Karnes County, north of the Pettus area (p. 114).

NORTH TEXAS: A new Ordovician area may be opened by a discovery in either the Ellenburger or Simpson in southeastern Jack County (p. 116).

OKLAHOMA: Prospects of two oil discoveries and a gas field are reported from Payne County (p. 125).

CALIFORNIA: A condensate well in the Santa Maria Valley made heavy oil on being reopened after a shutdown (p. 110).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended February 20, 1943)

	Oil	Gas	Dry	Total	Footage	Comp. to date 1943	Comp. to date 1942
N. Y., Pa., and W. Va.	46	4	2	52	161,247	398	598
Ohio	1	8	1	10	24,401	94	153
Indiana	3	1	4	8	12,960	34	50
Kentucky	3	1	2	6	10,129	32	43
Illinois	19	0	10	29	73,935	240	302
Michigan	4	0	5	9	24,093	53	112
Kansas	13	1	15	29	98,584	176	248
Nebraska	0	0	0	0	0	3	5
Missouri, Iowa	0	0	0	0	0	2	1
Oklahoma	9	0	9	18	66,841	150	223
Texas:							
North Central Texas	3	0	9	12	27,819	153	257
West Texas	13	0	2	15	71,080	112	299
Texas Panhandle	0	0	0	0	0	28	110
Eastern Texas	1	2	2	5	25,176	34	78
Texas Gulf Coast	3	1	3	7	49,660	51	137
Southwest Texas	5	1	8	14	78,112	113	214
Total Texas	25	4	24	53	251,847	491	1,095
North Louisiana	1	1	5	7	26,436	40	89
Louisiana Gulf Coast	6	0	2	8	52,890	49	92
Total Louisiana	7	1	7	15	79,326	89	181
Arkansas	4	0	3	7	36,593	24	22
Mississippi and Southeast	0	0	1	1	5,051	4	10
Montana	1	1	0	2	4,712	20	23
Wyoming	1	0	0	1	5,550	19	8
Colorado, Utah	0	0	0	0	0	1	2
New Mexico	3	0	1	4	9,474	27	37
California	13	0	4	17	65,086	128	153
Total United States	152	21	87	260	929,809	1,985	3,259
Total previous week	163	37	83	283			
Week ended Feb. 21, 1942	234	34	99	367			

Drilling Restrictions Bottle Up Large Reserve at Wilmington

by L. P. Stockman

Because of the development of deeper zones at Wilmington, operators are attempting to secure permission to drill wells to develop an estimated reserve of 50,000,000 bbl. of heavy oil in shallow pays by drilling twin wells. Conditions in the different pays make close spacing necessary for maximum recovery.

AT the last general session of the production committee of District 5, held in Los Angeles, December 16, and attended by several hundred California operators, R. K. Davies, deputy petroleum administrator, in a specially prepared paper expressed considerable concern over the inability of California prospectors to discover new important reserves of crude oil. D. R. Knowlton, director of production, and who was present at the meeting, also expressed concern about California's probable inability to meet future demands due to lack of new reserves. This professed anxiety could be greatly alleviated if PAW would recognize the fact there is a 50,000,000-bbl. reserve in the Tar sand waiting development in the Wilmington field of Los Angeles Basin, immediately adjacent to tidewater, and authorize immediate development of this virgin zone. As a matter of fact, a portion of this field lies beneath submerged and reclaimed land and there is a multiplicity of refineries and pipe lines located in the same general area. The location of this field is ideal from every standpoint as it requires a minimum of critical material per barrel of production, does not involve any transportation bottlenecks such as exist elsewhere in the state and is located in an area involving the largest concentration of population in the state.

The inability of operators in the Wilmington field to make this large reserve of crude oil available in the present emergency is due to the fact that their requests for exceptions to M-68 as amended, have been definitely turned down by OPC, and its successor, PAW. As a result of this refusal to grant the necessary exceptions, PAW places itself in the position of refusing to authorize development of this large reserve, which is desperately needed, in order

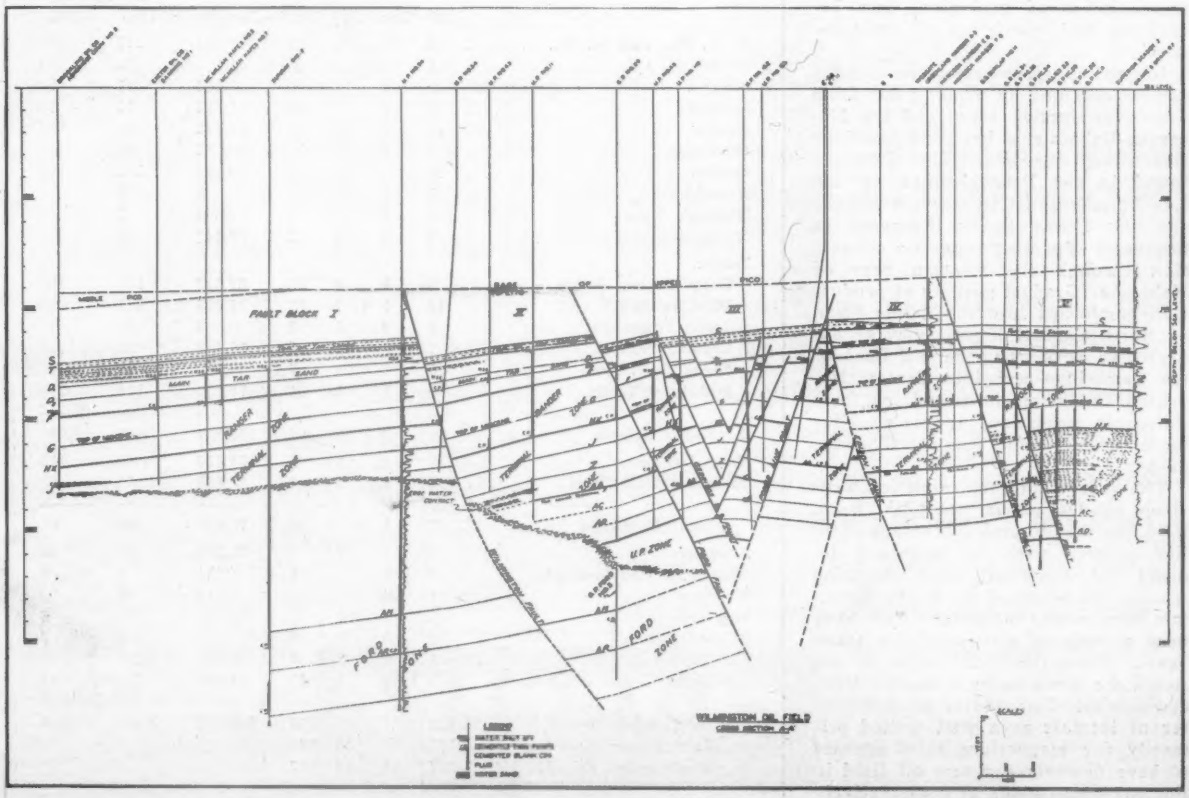

Fig. 1—East-West cross-section of Wilmington field showing complicated faulting which necessitates close spacing of wells

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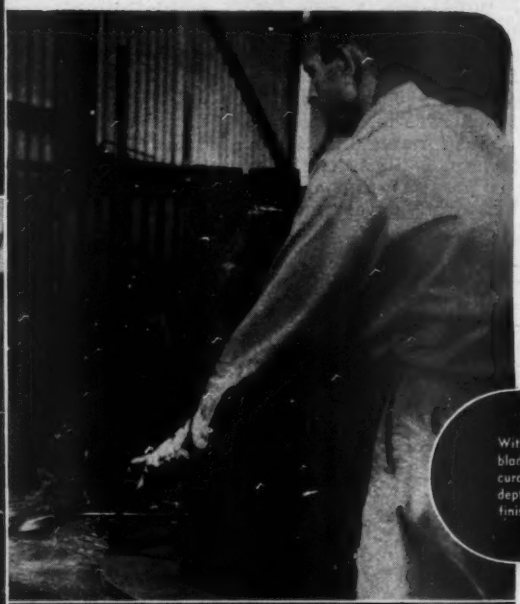

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to maintain its formula based on surface acreage instead of zonal locations. This formula obviously penalizes fields with a multiplicity of separate and distinct zones, a characteristic of many California fields. California operators have been fighting this interpretation for over a year and A. C. Rubel, vice president of Union Oil Co., several months ago called attention to the fact that progressive development of the Santa Fe Springs field, with its seven distinct and separate zones, could not have been possible under the provisions of M-68 which, with some exceptions, requires a 40-acre spacing program which can be changed to cover certain requirements in older fields and permit development on a more favorable basis. Wilmington has five distinct productive zones and is therefore in the same position which would have confronted operators at Santa Fe Springs had M-68 been in effect when that field was discovered. The weakness of the formula under which PAW is operating is illustrated by the fact that it prevents comparatively shallow Tar sand development at Wilmington and yet permits development work to continue in areas such as Helm, Raisin City and Riverdale where deep drilling is required and consequently more critical material is needed. Fundamentally, the case rests upon whether it is advisable to allow development of each individual zone on the basis of one well to not less than 10 acres or whether the entire field should be limited to one well to 10 acres irrespective of how many zones it contains. There is a very distinct difference in the application of these two restrictions. PAW objects apparently to the drilling of two wells on any 10 acres even though each well produces from a different sand and separate zone. It is the same old story of a field with a multiplicity of zones being penalized and operators prevented from proceeding with normal development work because it would take two wells on a 10-acre plot to produce two zones whereas M-68 prohibits the drilling of more than one well to 10 acres and in new fields not more than one well to each 40 acres.

Specifically, the proposal, which PAW has turned down, contemplated the drilling of 81 wells on 834 acres, approximately one well to 10 acres. Of this group, 51 were to be drilled to the Tar sand, exclusively, and 30 were to be multiple-zone wells involving the Tar sand and the Ranger zone, both of which are of Pliocene age and show similar producing and formation characteristics. Broken down by operators, the request for exceptions called for one well to be drilled by Brookline Oil Co., 14 by General Petroleum Corp.; 12 by Long Beach Oil Development Co., and 54 by Union Pacific Railroad Co. In turning down this request for exceptions to M-68, PAW recommended that operators kill wells producing from the Terminal zone and perforate opposite the Tar and Ranger zones. Operators bluntly term this proposal as stupid and call attention to the fact that such an undertaking would involve the risk of losing the lower part of the hole and would actually reduce field production instead of increasing it because of the greater productivity of the Terminal zone. This proposal, submitted to PAW, covered

Fig. 2—Map of eastern sector of Wilmington field showing how wells prevent drilling of additional wells to shallow heavy-oil zones

834 acres in the so-called Terminal section of the Wilmington field and was mutually satisfactory to all parties concerned. The Terminal area consists of fault Blocks 2 and 3 and that part of Block 1 south of the town-lot area. The eastern end of the Terminal area is the power line fault which roughly parallels the north-south power line of the Southern California Edison Co. Fault Blocks 4 and 5 which include the Long Beach Harbor section of the field are not included in the Terminal area as it is commonly known.

In order to provide an adequate background, it would not be amiss to say that the Wilmington field is divided into five fault blocks each independent of the other and forming separate drainage areas. The faulting is of such a nature that there is no drainage or migration of oil or gas from one fault block to another. In view of this structural condition, it is possible to vary production and development in one fault block without affecting other adjacent fault blocks. The Tar zone, which operators in the Terminal section of the Wilmington field desire to develop, is really an excellent zone although not as prolific as the Terminal and Ford zones. The Tar zone is about 200 ft. thick and the base of the zone is at 2,400-2,800 ft. The sand produces a 13.2 to 14.7-gravity oil that yields approximately 100 per cent residuum. Gravities as high as 18° A.P.I. are expected in the higher structural locations as yet undrilled. Sulfur content of the crude approximates 1.94 per cent but this can be blended off when mixed with sulfur-free crude in volume.

The program submitted by operators in the Terminal section of the Wilmington field was designed to permit development of the Tar zone on a 10-acre basis. This spacing program was deemed advantageous and necessary because (1) the high viscosity of oil in the Tar zone makes close spacing advisable for maximum recovery; (2) faults definitely act as barriers to movement of fluid necessitating close spacing to insure drainage of individual fault blocks; (3) production will be proportional to the number of wells producing.

Considering the Wilmington field as a whole and including the town-lot area, a check will show the average acreage per well is about 3⅛ acres for all zones. The Terminal section of the field is not so densely developed. In considering this 3⅛ acres per well, it must be remembered that the wells involved are producing from more than one zone and further this data includes wells in the town-lot area where substantial drilling has taken place. Walter J. Green, petroleum engineer, California Division of Oil and Gas, in a written report on the development of the Wilmington field, says: "It is the writer's opinion that the effective drainage of a well in the Wilmington field is less than 3 acres. This was demonstrated in many cases where wells were redrilled due to collapsed casing. Upon recompletion they produced initially slightly more oil than prior to the redrill jobs. At the same time a new well, located approximately 150 ft. from producers on all sides was completed for from two to three times the initial production of the redrilled well, indicating a relatively small effective drainage area."

A comparison between the Tar zone and the Ranger zone will show:

	Tar zone	Ranger zone
Porosity	32 to 38%	32 to 38%
Permeability	40—1,431 md.	78—1,750 md.
Connate water	Estimated average 25% to 30% for both zones.	

Based on a recovery of 35,000,000 bbl. from the Tar zone in the Terminal section of the Wilmington field, crude-oil production during the first year would approximate 3,250,000 bbl., an average of about 110 bbl. per well per day, if all of the proposed 81 wells were to be completed simultaneously and good production practice followed. Under the same conditions, these wells would produce 2,400,000 bbl. during the second year, a daily average of 80 bbl. per well and approximately 10,500,000 bbl. for the first 5-year period, an average of 70 bbl. per well per day. This would represent a daily production the second year of 6,575 bbl. and a daily average of 5,759 bbl. for the initial 5-year period. The 81 proposed Tar zone wells to be drilled in the Terminal section of the Wilmington field, if authorization is granted, would only require 4,140 tons of casing, tubing, rods, pumping units and other miscellaneous equipment. Most of the necessary authorization is granted by PAW. These shallow-zone wells could use either an 8⅝-in. or 7-in. water string and then 200 to 500 ft. of 4-in. or 5¾-in. liner. Many of these Tar zone wells would be brought in flowing and thus would not require pumping units. No other plants or facilities would be required as existing derricks could be utilized in their present location or skidded to new locations.

There are about 1,600 proved undeveloped acres for Tar zone production in the Wilmington field at the present time. Of this total, 800 acres are located in the Terminal section of the field and 800 acres elsewhere, principally in the Long Beach Harbor section of the field. The Tar zone in the Terminal area contains 102,290 acre-ft. There are seven separate zones at the highest structural point in the Terminal section of the field. From top to bottom these separate zones are the Tar, upper and lower Ranger of Pliocene age and the upper and lower Terminal, the Union Pacific, and the Ford zones of Miocene age. The Ford zone, due to a gentlemen's agreement made 2 or 3 years ago, has not been fully developed. Seven wells have been drilled to the Ford in the Terminal section of the field but no wells have been completed in Ford zone in the Long Beach Harbor section of the field. The discovery well of this horizon was drilled by General Petroleum Corp. and although this initial well drilled entirely through the Ford zone it was not produced in the first well. The Ford zone in the Terminal section of the field is about 250 ft. thick and consists of about 50 per cent sand. The Ford in the Long Beach Harbor section is expected to be far superior to that in the Terminal area.

The Tar zone is still practically a virgin sand in the Terminal area as only two wells have been finished in this horizon to date. Both of them showed substantial production under a natural flow. The Union Pacific zone is a comparatively recent development and may be restricted to structurally high positions as it was absent in the Ford zone discovery well. It is located above the Ford and below the base of the lower Terminal zone. It is about 200 ft. in thickness and shows fairly high porosities and permeability, indicative of good sustained production. The Ford zone in both the Terminal and Long Beach Harbor sections of the Wilmington field is another large crude-oil reserve which could be developed if necessity demands but this would involve the changing of restrictions imposed by M-68 as amended.

There are only seven fields in California, Cat Canyon, Gato Ridge, Lompoc, Yorba Linda, Midway-Lakeview, Mount Poso and Round Mountain, which show a more attractive steel factor than Wilmington on a barrel per ton basis. In addition, Cat Canyon, Gato Ridge and Lompoc are limited by the existing bottleneck in transportation. The Tar zone, uppermost horizon, has been developed over less than 10 per cent of the Wilmington field and electric logs and other data indicate there is approximately 50,000,000 bbl. of oil ranging from 14 to 18-gravity available for development. Whether this heavy crude oil becomes available depends entirely upon PAW. The Conservation Committee of California Oil Producers once had a formula known as the uniform method of allotment but when the chips were down and the industry needed additional crude oil the formula was changed. The present formula in M-68 is defeating its purpose by preventing development of a large reserve of crude oil and should be changed. Instead of talking about changing the objectionable formula, Washington talks about laying a pipe line from Texas to California.

CALIFORNIA

Pleasant Valley Test Opens New Field From Gatchell Sand

LOS ANGELES, Calif.—Standard Oil Co. removed any doubt that might have existed regarding the potentiality of the Pleasant Valley district of Fresno County by completing 82-29-F Pleasant Valley Farms in 29-20s-16e, flowing 830 bbl. of clean 28.3-gravity oil per day from the equivalent of the Gatchell oil sand of Eocene age and in doing so gave California its first new oil field of 1943. Very little is known regarding this new region except that it will probably not run parallel to the Coalinga Nose and Ketleman North Dome field. Limited data available indicates the presence of a fault which might have a direct bearing on the structure and productive acreage. Standard's discovery well is located a little less than 1 mile south of the southern tip of the Coalinga Nose field but apparently does not have connection with Coalinga Nose as there is a dry hole at the southern tip of the nose. Production is limited to the east by R. S. Lytle 68-28-F in 28-20s-16e, which failed to find production in the Gatchell equivalent even though the hole was carried down to 11,586 ft. This latter well found the Gatchell to be a very thin streak that contained no oil and very little gas. This leaves two directions open. The field may therefore extend to the southwest or to the west. The most sought after acreage is located to the west of Standard's new well and this is borne out by the result of seismograph work in the area.

Property adjacent to Standard's new well is held in large blocks and for this reason development work will be along conservative lines and in accordance with good engineering practice. As a result of this completion plans are under consideration for the drilling of two additional wells by operators other than Standard. The initial production of this new discovery well should not be construed as indicating the capacity of the well as Standard Oil Co. did not permit it to produce wide open or even for any great length of time through the bean under which it was completed. The 36/64-in. bean through which the well was brought in was subsequently reduced to 20/64-in. thence to 16/64-in. and then to 12/64-in. The final size of the bean will be governed by the amount of daily production desired. A total of 209 ft. of Gatchell oil sand was cored in Standard's discovery well and the bit was still in the pay when drilling operations were concluded.

The large drain on dry gas fields in California during the past winter period, reflecting conversion of the Stanpac gas line to crude oil has greatly stimulated the search for new gas fields in the central part of the state. Richfield Oil Corp. recently tied up 5,700 acres of bottom lands in Sacramento County by negotiating a lease with the Natomas Co. which acquired the property a number of years ago for hydraulic gold mining. Richfield's property is located about 14 miles north of Sacramento and the first well will be drilled in 17-10n-4e. Up to the Lodi region of San Joaquin County, Amerada Petroleum Corp. is making preparations to begin drilling operations in 9-4n-7e, and Bankline Oil Co. has location staked for a wildcat to be drilled in 1-4n-6e. Additional drilling is getting under way in the Rio Vista gas field and in adjacent territory in the Delta region of the Sacramento River.

DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 20 crude oil	Feb. PAW quota all oils	Feb. 13 crude oil
Arkansas	75,300	78,700	75,700
California	780,250	823,700	773,250
Colorado	6,075	7,000	6,100
Eastern fields	94,500	114,600	91,000
Illinois	245,500	272,200	239,000
Indiana	16,000	17,200	18,000
Kansas	316,650	310,500	299,850
Louisiana	337,250	349,800	338,150
North Louisiana	*90,700*	.....	*91,600*
Louisiana Gulf Coast	*246,550*	.....	*246,550*
Michigan	58,600	63,700	60,500
Mississippi	55,000	50,000	56,900
Montana	19,090	24,700	17,250
Nebraska	2,300	3,000	2,200
New Mexico	105,110	105,800	104,000
Oklahoma	347,700	395,300	352,600
Texas	1,343,000	1,452,000	1,341,000
East Texas	*325,100*	.....	*325,100*
West Texas	*213,900*	.....	*213,900*
North Central Texas	*135,350*	.....	*135,350*
East Central Texas	*100,000*	.....	*100,000*
Texas Panhandle	*88,900*	.....	*88,900*
Texas Gulf Coast	*414,250*	.....	*412,250*
Southwest Texas	*65,500*	.....	*65,500*
Wyoming	91,800	94,100	88,900
Total United States	3,894,125	4,162,300	3,864,400
Total production Jan. 1-Feb. 20, 1943			196,812,440 bbl.
Same period last year			210,776,320 bbl.

Kern Front

Standard Oil Co. with three strings of drilling tools in operation this week staked locations for 17 additional wells in the Kern Front field of Kern County and while all of them will not be drilled simultaneously this program should be finished during the coming summer. The pay in this field is found about 2,500-2,800 ft. and for this reason most of this drilling will be done with portable equipment. Standard Oil Co. also has a number of locations waiting for crews in the Midway-Sunset field of Kern County where additional shallow production can be expected.

SAN JOAQUIN VALLEY COMPLETIONS

Antelope Plains, Kern County: Shell Oil Co., Inc., 78-31 Hopkins fee, 31-27s-20e, dry, T.D. 3,013 ft., gas zone and Williams oil sand of Miocene age absent at this location, defines northern limits of production.

Belridge, South, Kern County: Belridge Oil Co. 85-32 fee, 32-28s-21e, pumped 10 bbl., 14°, 25 per cent cut, T.D. 759 ft., perf. 713-59 ft., completed in upper Belridge zone of Pliocene age.

General 26-3 Marine, 3-29s-21e, pumped 20 bbl., 14°, 25 per cent cut, T.D. 1,080 ft., perf. 809-1,080 ft., completed in upper Belridge zone of Pliocene age.

Coalinga, East, Fresno County: Shell 162-32 fee, 32-19s-15e, pumped 193 bbl., 19.4°, 3.2 per cent cut, T.D. 2,750 ft., perf. 2,628-2,748 ft., completed in East Coalinga zone of Miocene age.

Shell 168-26 fee, 26-19s-15e, pumped 118 bbl., 27.8°, 2 per cent cut, T.D. 3,240 ft., perf. 2,910-3,035 ft., 3,080-3,237 ft., completed in East Coalinga zone of Miocene age.

Standard 109-35-A fee, 35-19s-15e, pumped 25 bbl., 21.4°, 3.9 per cent cut, T.D. 3,065 ft., 40 mesh perf. 2,926-3,062 ft., completed in East Coalinga zone of Miocene age.

Standard 111-35-A fee, 35-19s-15e, pumped 55 bbl., 21°, 1.8 per cent cut, T.D. 3,195 ft., P.B. 3,160 ft., 60 mesh perf. 3,010-3,159 ft., completed in East Coalinga zone of Miocene age.

Devils Den wildcat district, Kern County: Devils Den Oil Co. 2 McColden, 26-25s-18e, dry, T.D. 524 ft., Devils Den oil sand absent.

Hanford wildcat district, Kings County: Continental 2 Drummond, 36-18s-22e, dry in gray sand, T.D. 5,401 ft.

Pleasant Valley (Guijarral), Fresno County: Standard 82-29-F Pleasant Valley Farms, 29-20s-16e, flowed 830 bbl. rate, 28.3°, 0.7 per cent cut, 496,000 cu. ft. gas, 36/64-in. bean, beaned back to 20/64-in. bean, pressures 975/800 lb., flow 450 bbl., 390,000 cu. ft. gas, beaning back to 16/64-in. bean, T.D. 9,151 ft., perf. 8,942-9,150 ft., completed from 208 ft. of rich Gatchell oil sand of Eocene age.

Potrero Hills wildcat district, Solano County: Richfield 1 Potrero Hills, 10-4n-1w, dry, T.D. 4,500 ft., gas zone found at this depth failed to show sustained production.

(Continued on Page 130)

PERMIAN BASIN, PANHANDLE

Oil Showings Encountered in Winkler County Wildcat

MIDLAND, Tex.—Shell Oil 1 Blue, eastern Winkler County wildcat, was reported to have showed oil on pits, and was conditioning hole preparatory to running a drill-stem test. The hole is bottomed at 9,194 ft. in Silurian formation, but complete information on the well is being withheld by the operators. Location is 30 miles due north of Gulf 5 Wristen, Silurian producer in Ward County, drilled to 9,187 ft., plugged back to 7,075 ft. Elevation of the Shell test is 3,098 ft.

In Andrews County, DeKalb Agricultural Association 1 Means, wildcat 3 miles southwest of the Means pool, was still trying to mill out packer at a total depth of 4,885 ft. The show of oil encountered at 4,860-78 ft. is now believed to be from the Grayburg lime instead of the San Andres as first reported. The Grayburg immediately overlies the San Andres, and produces in the North Cowden pool of Ector County, about 15 miles south of the DeKalb test.

In Pecos County, Magnolia 1-29 Eaton, Section 29, Block 3, H.&T.C. Ry. Survey, southwest of the Abell pool, topped Simpson at 6,375 ft. and was drilling below 6,508 ft. in lime. Elevation is 2,430 ft. Gulf 1 Rooney Mercantile Co., Section 82, Block OW, 8 miles northwest of Fort Stockton, was drilling at 4,620 ft. Phillips Petroleum 1 Ada Price, Section 11, Block 101, T.&St.L. Survey, 27 miles southeast of Fort Stockton, was drilling ahead in shale below 9,055 ft. Standard of Texas 1 Douglas Oil, west of the Yates pool, was drilling lime below 1,500 ft.

WEST TEXAS COMPLETIONS

Fields

Apco-Warner, Pecos County: Magnolia 1 E. Fromme, N¼ N¼ Sec. 106, Blk. 10, H.&G.N. Sur., elev. 2,442 ft., perf. 4,715-25 ft. in Cambrian, dry, P.B. and perf. 4,520-75 ft. in Ellenburger dolomite, flowed 1,580 bbl., ½-in. choke, T.D. 4,727 ft.

Clara Couch, Crockett County: Cities Service 1 W. O. Owens, NW NW Sec. 14, Blk. GG, H.&O.B. Sur., elev. 2,723 ft., dry, T.D. 2,303 ft., lime.

Embar Ellenburger, Andrews County: Phillips 20 University Andrews, NE NE Sec. 36, Blk. 11, Univ. Sur., flowed 992 bbl., ¼-in. choke, perf. 7,950-58 ft., Ellenburger lime, T.D. 7,966 ft.

Goldsmith, Ector County: Bay Pet. & Carl B. King 1-B Cummins, 2,200 ft. from N, 1,760 ft. from E lines, Sec. 32, Blk. 45, Twp. 1n, T.&P. Sur., I.P. 60 bbl., 34 gravity, pay 4,235 ft., lime, T.D. 4,280 ft.

Bay Petroleum and Carl B. King 2 H. E. Cummins, 880 ft. from S, 1,760 ft. from E lines, Sec. 26, Blk. 45, Twp. 2s, T.&P. Ry. Sur., elev. 3,256 ft., flowed 448 bbl. 38 gravity, pay 4,260 ft., T.D. 4,305 ft., lime.

Munger & Nix, Andrews County: Seaboard Oil Corp. 1 Muner & Nix, O.W.D.D, C NE Sec. 1, Blk. 41, Public School Land, elev. 3,250 ft., old T.D. 4,526 ft., pumped 120 bbl. fluid, 7 per cent water, pay 4,430 ft., P.B. to 4,550 ft. from T.D. 4,789 ft.

Russell, Gaines County: Shell 1 D. N. Leaverton, SW SW Sec. 458, Blk. G, C.C.S.D. &R.G.N.G. Sur., elev. 3,590 ft., pumped 213 bbl. 35.2 gravity, pay 7,480 ft, Clear Fork lime topped at 7,487 ft., acid 16,000 gal. acid, T.D. 7,772 ft., discovery.

Slaughter, Cochran County: Continental 11-58 Carrie S. Dean, 1,952 ft. from N, 2,009 ft. from E lines, Lge. 58, Martin County School Land, elev. 3,687 ft., flowed 1,571 bbl. 32.1 gravity, pay 4,925 ft., lime, T.D. 4,973 ft.

Bay Pet. 8 Humble-Mallett, NW Lab. 20, Lge. 53, Scurry County School Land, elev. 3,639 ft., pumped 295 bbl., pay 5,016 ft., lime, T.D. 5,039 ft.

J. A. Humphrey 1 Carrie S. Dean, NW cor. 525-acre lease, Lge. 91, Lipscomb County School Land, flowed 729 bbl., pay 5,015 ft., T.D. 5,062 ft.

Slaughter, Hockley County: T. F. Morrow 21 Mallet, SW cor. Lab. 18, Lge. 48, Edwards County School Land, elev. 3,598 ft., flowed 545 bbl., pay 4,912 ft., T.D. 4,957 ft.

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T. F. Morrow 14 Mallet, SE cor. Lab. 20, Lge. 48, Edwards County School Land, flowed 770 bbl. pay 4,888 ft., T.D. 4,939 ft.

Wasson, Gaines County: Bay Pet. 2 Humble-Wasson, NE NW Sec. 53, Blk. AX, Public School Land, elev. 3,582 ft., flowed 259 bbl., pay 4,915 ft., lime, T.D. 4,968 ft.

Continental Oil 7-43 G. M. Langdon, 710 ft. from S and W lines, Sec. 43, Blk. AX, Public School Land, dry, T.D. 5,000 ft. lime.

World, Crockett County: M & M Drilling Co. 1-E L. P. Powell, O.W.W.O., pumped 20 bbl. plus 300 bbl. water, pay 2,601 ft. lime, P.B. to 2,660 ft. from T.D. 2,712 ft

PANHANDLE COMPLETIONS

Carson County: Cities Service 8 J. W. Fields, SE NE NE Sec. 13, Blk. 7, H.&G.N. Sur., pumped 33 bbl., pay 3,195-3,235 ft., granite wash, T.D. 3,240 ft.

Phillips 1 Lenhart (Wray), SE SE NW Sec. 230, Blk. B-2, H.&G.N. Sur., elev. 3,303 ft., flowed 2,500,000 cu. ft. gas, pay 2,755-2,835 ft., dolomite, T.D. 2,996 ft.

Gray County: Phillips 1 Clay, NW NW SE Sec. 177, Blk. B-2, H.&G.N. Sur., elev. 3,192 ft., pumped 147 bbl., pay 2,995-3,016 ft., granite wash, T.D. 3,041 ft.

Magnolia 57 fee, NW SW Sec. 11, Blk. 3, I.&G.N. Sur., elev. 2,883 ft., pumped 70 bbl., pay 2,798-2,845 ft., lime and dolomite, T.D. 2,895 ft.

Texas 10-B Chapman, NW SW SW Sec. 49, Blk A-9, H.&G.N. Sur., elev. 2,785 ft., pumped 197 bbl., pay 2,688-2,760 ft., and 2,772-86 ft., granite wash, T.D. 2,786 ft.

Hutchinson County: J. M. Huber Corp. 4 Bryan, E½ NW SW Sec. 2, Blk. M-24, T.C.R.R. Sur., O.W.D.D., new I.P. 50 bbl.

Phillips 5 Snow, 1,325 ft. from N and E lines Sec. 46, Blk. 47, H.&T.C. Sur., elev. 2,852 ft., flowed 12,375,000 cu. ft. gas, pay 1,992-2,350 ft. lime and shale, T.D. 2,350 ft.

Phillips 6 Snow, C Sec. 3, John Poitevent Sur., elev. 3,179 ft., flowed 6,000,000 cu. ft. gas, pay 2,517-2,680 ft., lime and dolomite, T.D. 2,750 ft.

Moore County: Phillips 1 Twill (William), 820 ft. from S, 330 ft. from most westerly E lines 160-acre lease, elev. 3,382 ft., flowed 6,250,000 cu. ft. gas, pay 3,234-40 ft., T.D. 3,284 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—R. Olsen and Atlantic 1 Langlie, deep test on the east side of the Langlie pool of southeastern Lea County, logged a stain of oil in lime drilled from 8,770-75 ft., probably in Simpson section of the Ordovician, which was topped at 8,225 ft., and was drilling below 8,830 ft. in lime and chert. The well was recently drilled deeper from 8,505 ft. where it had been shut down. Original contract depth was 8,500 ft. The other deep test in Southeast New Mexico, Standard 1 Fuller, 20 miles south of Tucumcari, Quay County, was drilling at about 5,500 ft. as the week ended, with no change reported.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcats

Lea County: Ward & Barefield 1 Cox, 20-18s-32e, dry, T.D. 1,300 ft., salt.

Fields

Maljamar, Lea County: Carper Drlg. 3-R Simon, NE NW 20-18s-32e, elev. 3,912 ft., flowed 248 bbl., pay 3,288 ft., lime, T.D. 3,934 ft.

J. K. (Rufus) Wallingford 1 State, NE NW 32-17s-32e, elev. 3,904 ft., flowed 50 bbl., pay 3,900-4,039 ft., shot, P.B. to 4,039 ft. from T.D. 4,041 ft.

B. Cockburn 6-B Pearsall, NE NE 33-17s-32e, O.W.D.D. and P.B., T.D. 4,209 ft., P.B. to 4,170 ft., shot 215 qt. 4,061-4,170 ft., flowed 80 bbl., old T.D. 4,010 ft.

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Where base stock for aviation gasoline is produced from refinery gases, by the Codimer Process, thorough drying of the gases is necessary. Otherwise the catalyst used in the process will absorb moisture and disintegrate.

Dehydration must be accomplished at a temperature of 135°F. or higher, to prevent condensation and loss of certain valuable hydrocarbons. Use of granular desiccants at gas temperatures above 100°F. is a new departure, as it has been believed heretofore that they could not be used to advantage under such conditions.

Florite Desiccant is highly effective in such use. The Codimer unit seen in our illustration is removing an estimated 24 gallons of water per cycle from 350,000 to 375,000 cubic feet of gas at 150°F., rendering the gas "bone dry" as required. Regeneration is carried out at 400°F.

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SOUTHWEST TEXAS

Karnes County Pool Opener Producing From Reklaw Sand

CORPUS CHRISTI, Tex. — Phillips Petroleum Co. and Adams Oil & Gas Co. have opened a new oil field with their 1 Reasoner, 5 miles southeast of Kenedy, in the Carlos Martinez Survey, Karnes County. The well, bottomed at 8,163 ft., was reported to be flowing at the rate of 96 bbl. of 47.5-gravity oil daily through ¼-in. choke from perforations at 6,582-90 ft. The 5½-in. casing was set at 6,650 ft. This wildcat is the second drilled on a block of about 6,000 acres owned by Phillips and Adams. The first one, put down last year on the Strunk farm, was a failure in the Wilcox. Of interest in connection with the Reasoner discovery is the fact that it is producing crude, while other recent strikes in the Wilcox area comprising Bee, Goliad, Karnes and De Witt counties, were gas or gas and distillate wells. The pay is in the Reklaw sand series, topped at 6,581 ft.

Continental Oil Co. and Atlantic Refining Co. 1 J. E. Pettus, which recently opened the Cabeza Creek field in Goliad County with an open flow of 19,000,000 cu. ft. of gas daily, is still shut in waiting for installation of a separator. A spray of distillate accompanied the gas.

LOWER GULF COAST COMPLETIONS

Wildcats

San Patricio County: Frank Buttram 1 F. and W. F. Cleveland, 3 mi. SE of Odem, dry at 7,007 ft.

Victoria County: La Gloria Corp. 1 W. L. Hopkins et al, 5 mi. S of Inez, dry at 6,262 ft.

Fields

Armagosa, Jim Wells County: Smith & Storey, Inc., 1-A Martha Earhart, 14 mi. NW of Alice, dry 3,800 ft.

Nordheim, De Witt County: Tide Water 1 I. D. Mueller, Stephen Prather Sur., 89 bbl. distillate and 3,810,000 cu. ft. gas, T.P. 2,380 lb., C.P. 2,485 lb., S.I. T.P. 2,700 lb., S.I. C.P. 2,650 lb., T.D. 9,500 ft.

North McFaddin, Victoria County: Gulf C-1 T. P. Traylor, William Dundas Sur. A-159, est. 2,250,000 cu. ft. gas, with spray of distillate through ¼-in. choke, T.P. 1,900 lb., T.D. 7,506 ft., P.B. 5,150 ft.

Plymouth, San Patricio County: Plymouth Oil Co. 32-C E. H. Welder, O.W.D.D., old T.D. 5,488 ft., new T.D. 5,887 ft., 51 bbl. through 7/64-in. choke, T.P. 2,000 lb., gas-oil ratio 13,530 ft.

Seeligson, Jim Wells County: Magnolia 38 Seeligson, Los Jaboncillos grant, 92 bbl. through 5/32-in. choke, perf. 5,670-72 ft., T.P. 500 lb., gas-oil ratio 430, T.D. 5,950 ft.

Sun 19 P. Canales, J. E. Stevens Sur., 115 bbl. through 7/64-in. choke, perf. 5,204-08 ft., T.P. 750 lb., S.I. C.P. 1,050 ft., T.D. 6,054 ft.

Stratton, Kleberg County: Humble 23 King Ranch-Paso Ancho, Paso Ancho de Abajo grant, dry 7,143 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcats

Guadalupe County: Weinert & Buchanan Co. 1 Carlota Verdeja, 5 mi. NE of Kingsbury, dry at 2,475 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

Starr County: Continental 116-A Slick, 10 mi. S of Robberson, dry at 4,377 ft.

Fields

Aviator, Webb County: Dulup Oil Co. 2 Puig Bros., Alberca de Arriba grant, 45 bbl. through ⅜-in. choke, T.P. 25 lb., C.P. 150 lb., T.D. 1,827 ft.

North Sun, Starr County: Sun 3 C. Laurel, La Sal Colorado grant, 158 bbl. through 9/64-in. choke, perf. 4,540-44 ft., T.P. 850 lb., C.P. 1,030 ft. (S.I.), gas-oil ratio 708, T.D. 4,620 ft., extension well.

Sejita, Duval County: Standard Oil Co. of Texas 1 George Leal, dry at 5,895 ft.

Washburn, La Salle County: Quintana Petroleum Co. 18 South Texas Syndicate,

(Continued on Page 138)

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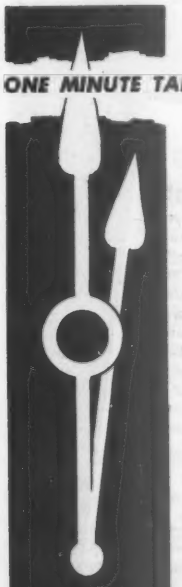

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EASTERN TEXAS

Freestone County Wildcat Testing Woodbine Sand

DALLAS, Tex. — Carter-Gregg Oil Co. 1 Steward, James Ames Survey, 4 miles north of Fairfield, perforated casing and was testing Woodbine sand which showed oil in drilling to total depth 4,048 ft. in water sand. Five and one-half-inch casing was set at 4,047 ft., and elevation is 344 ft., derrick floor. The well is in an area where three previous Woodbine tests have been drilled, all dry, but indicating favorable structural conditions. Deepest test was Ohio 1 O. B. Utley, S. J. Claypool Survey, which reached total depth of 4,506 ft.

In the Keechi dome area of Anderson County, the Texas Co. will try again for oil production at its 2 Greenwood, 2,157 ft. from east, 1,287 ft. from north lines of Greenwood tract of 450 acres in the R. R. Powers Survey. Numerous shallow tests have been drilled on the dome without success, and it is believed that the new operation will go sufficiently deep to test the Paluxy and Glen Rose horizons.

The Dallas County wildcat, Lucey & Guiberson 1 Moyer which reported dry at total depth 4,504 ft. in schist, was drilled deeper to total depth 4,843 ft. in Paleozoic topped at 4,453 ft.

Tide Water and Seaboard 1 Bacon, southern Franklin County wildcat, topped Paluxy at 5,710 ft. and was drilling below 5,800 ft. The Woodbine was dry at 4,110 ft. Stanolind Oil & Gas Co. 1-B Tri-Cities unit, 6 miles southwest of Athens, Henderson County, was drilling below 6,520 ft. in shale and lime, and same company's 1-D Tri-Cities unit in the same area was shut down for repairs at 3,352 ft.

Three wells in the Quitman pool of Wood County are completing. Delta Drilling 1 J. A. Blalock, east offset to the discovery, set 5½-in. casing at 6,394 ft., total depth, and was preparing to perforate. It reported 89 ft. good oil sand. Delta and Shell 1 Goldsmith-Blalock, west offset to the opener, was drilling at about 6,000 ft., and Shell 1 J. R. Blalock, north offset, was perforating casing set at plugged-back depth 6,390 ft. Shell 2 Goldsmith was drilling below 5,200 ft. In the Coke pool of northern Wood County, Amerada has completed 1 McCreight for a potential of 223 bbl. 24-gravity oil from Paluxy sand, 6,299-6,332 ft.

EAST TEXAS COMPLETIONS

Wildcats

Houston County: M. G. M. Oil 1 A. M. Jeter, 660 ft. from S and E lines 101-acre tract, or 4,100 ft. from W, 1,400 ft. from N lines, J. Forbes Sur., dry, T.D. 3,315 ft.

(Continued on Page 117)

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N. CENTRAL TEXAS

Test in Southeast Jack County Flows Wet Gas From Sandy Lime

WICHITA FALLS, Tex.—Joe Worsham 1-A L. A. Meador estate, located in Block 22, Henderson County School Land Survey, 1½ miles northwest of Gibtown in the southeast part of Jack County, flowed an estimated 2,500,000 cu. ft. of very wet gas from sandy lime topped at 6,020 ft. Six-inch casing had been set at 5,288 ft., and the test was bottomed at 6,095 ft. in Ellenburger lime. The distillate tested 52 gravity. Cavings developed when the gas started flowing, and a liner will be set prior to testing the well. It has not been definitely decided whether the flow is coming from Simpson sand or Ellenburger lime. This well is a twin to Worsham 1 Meador which showed oil from the Bend horizon at total depth 5,277 ft., where tools were blown up in the hole and stuck, and the hole was subsequently junked after efforts to recover tools were futile. Only small showings were encountered in 1-A Meador in the Bend at 5,380 ft., and small shows were also reported in the Strawn at 2,870 ft. and 3,310 ft. The Ellenburger was topped 40 ft. higher than in a dry hole drilled in October 1941, 3 miles northwest, by F. Kirk Johnson et al in the Joseph Turner Survey, which topped Ellenburger at 6,113 ft. and was abandoned at 6,175 ft. Two other tests in the Gibtown area are due to get under way soon. East of town 1 mile Paul Gunther 1 Bailey is preparing to move in, and 2 miles west of town Webster & Bradstreet 1 Biggers is a new location.

East of Jermyn in Jack County, Shell Oil 1 Wolfe flowed 400,000 cu. ft. gas with spray of oil and water from perforations 4,375-85 ft. and 4,395-4,405 ft. in Bend formation, and may reacidize. Gwynn & Overby 1 Kinder, 5 miles southwest of Jacksboro, had stains of oil in sand at 4,085-4,125 ft. and were drilling ahead. Rathke Oil 1 Jagoda, 1½ miles west of Joplin, is shut down for orders. Only a small amount of oil was recovered after treating sandy lime from 4,510-30 ft. with 1,750 gal. acid, and the test will probably be abandoned. Youngblood & Foree are moving rig into location for 1 Fulcher, 6,400-ft. rotary test 3 miles north of Post Oak.

NORTH TEXAS COMPLETIONS

Wildcats

Clay County: Roy Lee, trustee, 1 C. T. Maddox, 330 ft. from S and E lines of W 125 ac. of N 250 ac. of T. M. Hughes Sur. A-179, pumped 15 bbl., perf. 120 shots 5,476-5,506 ft., Caddo 5,467 ft., Ellenburger 5,583-5,672 ft., T.D. 5,672 ft., discovery.

Fields

Allar-Hunt, Young County: Panhandle Ref. 8 Allar Co., 1,720 ft. from E, 3,788 ft. from southerly N lines Sec. 3409, T.E.&L. Sur., pumped 268 bbl., pay 2,721-42 ft., sand, T.D. 2,742 ft.

Burkburnett, Wichita County: C. Y. Gorman 6 W. L. Doyle, Lot 3, Wheelwright Sur. A-320, dry, T.D. 1,233 ft.

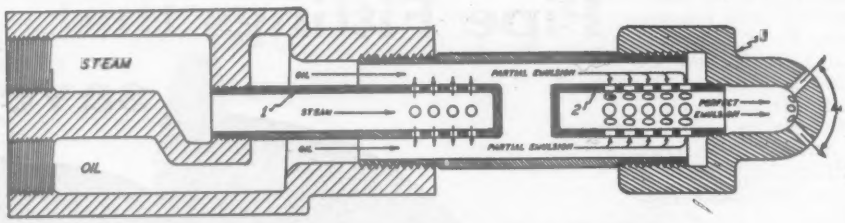
Electra, Wichita County: White & Duncan 1 W. T. Waggoner "A," Seale & Morris Sur. A-393, dry, T.D. 1,622 ft.

Iowa Park, Wichita County: Martin Properties 1 J. L. Jackson, 675 ft. from N. 910 ft. from E lines Blk. 16, Denton County School Land, Lge. 4, dry, T.D. 1,191 ft.

Murray, Young County: Standard of Texas and Hanlon-Buchanan 2 S. R. Donnell, 467 ft. from S and W lines Sec. 2370, T.E.&L. Sur., elev. 1,300 ft., dry, T.D. 4,839 ft.

Olney, Archer County: Paul Atchley 1 S. M. Benson "E," Sec. 1398, T.E.&L. Sur., dry, T.D. 994 ft.

Rendham, Baylor County: Jordan Pet. 1 Fayette-Staton 3,166 ft. from N, 7,946



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ft. from W lines Fayette County School Land, Sur. A-148, pumped 51 bbl., pay 3,019 ft., lime, T.D. 3,024 ft.

True, Young County: R. J. Watson 2 Mrs. C. J. Taack, Sec. 248, T.E.&L. Sur., dry, T.D. 750 ft.

Offset to Carlile Discovery Started

ABILENE, Tex.—The Carlile pool of northwest Stonewall County, which has two wells drilled 4 years ago by W. I. Southern, Inc., in Section 293, Block D, H.&T.C.R.R. Survey, is to get a new test as a southwest offset to the discovery, which had a daily potential of 225 bbl. from pay at 5,169-75 ft. The new test is Hunter & Hunter 1 Jim Harrison, 660 ft. from north, 833 ft. from west line Section 294, Block D, H.&T.C.R.R. Survey.

In Eastland County, south of Rising Star, north of the Crownover pool, a new play is developing with several new tests to be announced shortly. Operators from Cisco are planning on drilling or reconditioning some of the old wells in the Hilburn field, which lies 2 miles northwest of Rising Star.

Short northwest extension for the Loving pool of western Stephens County was effected by Wittmer, Knight & Ewing 5 D. B. Loving, SW SE Section 66, Blind Asylum Land, which flowed 100 bbl. per day from Caddo lime from 3,481-3,507 ft. J. D. Hancock 1 Blach Brothers, wildcat in northern Stephens County, scheduled for the Ellenburger at 4,600 ft., was drilling at about 800 ft.

Attempt to extend the Wimberly field of Jones County to the east was unsuccessful at Ungren & Frazier et al 1 M. A. Moore, Section 137, G. Martinez Survey, and the well was abandoned at 2,257 ft.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Callahan County: L. M. White 1 Finley, SE NE NW Sec. 74, Bayland Orphan Home Sur., dry, T.D. 700 ft.

Fields

Cook, Shackelford County: Roeser & Pendleton et al 4-A W. I. Cook Est., SE NW SW Sec. 139, T.E.&L. Sur., dry, T.D. 1,812 ft.

Strawn, Palo Pinto County: Palo Pinto Oil & Gas Co. 31 Strawn Coal Co., A. Ashworth Sur., dry, T.D. 3,220 ft.

Eastern Texas

(Continued from Page 115)

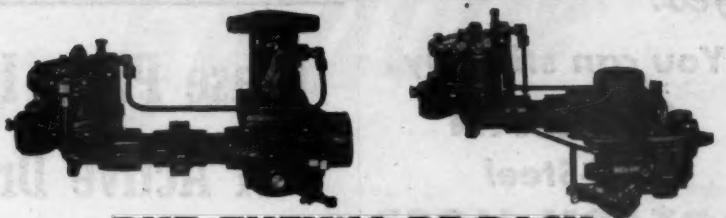
San Augustine County: Continental Oil 1 Long-Bell Lumber Co., 15,650 ft. from W, 2,900 ft. from N lines, A. Hotchkiss Sur., elev. 315 ft., dry, T.D. 4,096 ft.

Carthage Gas, Panola County: W. C. Feazel 2 E. L. Burnett, T. F. Hill Sur., elev. 210 ft., pay through perf. 5,784-5,804 ft., flowed 35,000,000 cu. ft. gas.

Hawkins, Wood County: Humble Oil & Refining 1-C Christian Women's Board of Missions, J. G. Heard Sur., elev. 409 ft., flowed 390 bbl., pay 4,594-99 ft., sand, T.D. 4,695 ft.

Willow Springs, Gregg County: Lone Star Gas 4 Horton & Dickson, H. G. Hudson Sur., perf. 7,250-70 ft. Pettit lime, flowed 32,000,000 cu. ft. gas, T.D. 7,367 ft.

THEY'VE GONE TO WAR



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ROCKY MOUNTAIN AREA

Lease Plays Indicate Approach Of Active Drilling Campaign

DENVER, Colo. — Three big lease plays in the Rocky Mountain area, all based on recent discoveries, foreshadow one of the most active campaigns the coming summer that has occurred in this territory in a number of years. The districts immediately involved are the Big Horn basin in northern Wyoming, the Denver basin in northeastern Colorado and southeastern Wyoming, and the Uinta River basin in eastern Grand County, Utah. Lease men representing the majors are active in all three areas and old geological reports are being dug out of the files and studied while preparations are being made for extensive field work as soon as weather conditions become favorable.

WYOMING COMPLETIONS

Lance Creek, Niobrara County: Continental Oil Co. 7 Apex-4, NW NW NW 35-36n-65w, T.D. 5,550 ft., 5⅝-in. 5,544 ft., swabbed 40 bbl., fluid in 8 hr., 10 per cent water, after acidizing several times.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 2 Tribal-229 SE NE SE 25-32n-6w, T.D. 3,062 ft., light show of oil in Sunburst at 2,985-3,010 ft., 7-in. 3,026 ft., upper Cut Bank 3,021-49 ft., 1,000 ft. oil in hole, no swabbing test, no lower Cut Bank sand.

Kevin-Sunburst, Toole County: Hannah-Porter 1 McHale near, C NW 2-32n-2w, T.D. 1,650 ft., dry in contact, P.B. to Sunburst at 1,453-95 and 1,512-22 ft., and completed for 550.000 cu. ft. gas.

The Utah operation, although completed last August except for testing, was hidden under a veil of secrecy on account of wartime restrictions until the past few weeks. The well, 1 Reeder, SW SE 4-22s-19e, was drilled by the Mack Drilling Co. under a contract with the Defense Plant Corp., an agency of the Reconstruction Finance Corp., on land under lease to the Utah Magnesium Corp. It is located 7 miles south and west of Thompson, on the Denver & Rio Grande Western Railroad, on the north end of the plunging axis of the Salt Valley anticline on what is known locally as the Crescent dome.

A number of wells have been drilled in the district, one only a few hundred feet away, in the past 20 years, some of which had oil and gas shows and indications of deposits of magnesium and potash. These, however, were drilled with cable tools and none went below 4,000 ft., all stopping short of the horizon reached in the Reeder well. The last named was put down with rotary tools and was cored most of the entire distance with a recovery of a fraction better than 91 per cent of the cores.

The Reeder well was drilled to 4,207 ft., having cut 1,770 ft. of Mancos shale, 37 ft. of Dakota sandstone, 284 ft. of the Morrison and 2,116 ft. of the Pennsylvanian-Paradox formation. It had the Dakota at 1,770-1,807 ft., with a show of oil in hard sand which probably lacks sufficient porosity to make it productive. It had shows of both oil and gas in the upper 12 ft. of a sand in the lower Morrison at 1,935-2,019 ft., strong odor of oil and gas at 3,103-16 ft., and the best shows from 4,178 ft. to the bottom of the hole in the Pennsylvanian. The well was shut in at 4,207 ft. with the hole full of 10.8-lb. drilling mud used in coring, after which it built up a pressure of 500 lb. above the mud at the top of the casing. Subsequently it was bled through the valve several times and yielded several barrels of very light oil. It is understood the oil runs 45° to 46° gravity and is similar to the Pennsylvanian oil produced in Oklahoma.

At present efforts are being made under the supervision of the U. S. Bureau of Mines to obtain a test of the oil showing. First attempts with a drill stem were unsuccessful and preparations are being made for a swabbing or bailing test. Indications are that it will make a commercial well. It was drilled primarily for magnesium chloride and it is reported that the possibilities in that direction are "tremendous," the deposit showing 78,600 tons of carnallite per acre with a content of 13,740 tons of metallic magnesium and 13,260 tons of potash.

The area is faulted and there appears to be considerable variation in the thickness of the beds in the several holes drilled. The lateral extent of the magnesium and potash deposits will not be known until after extensive exploration takes place and the value of the oil discovery may be very farreaching. The anticline runs directly toward the so-called Colorado River structure which a few years ago attracted wide attention when oil was found in shale streaks in some of the thickest beds of salt found in this country. Leasing has been under way throughout the territory for several months. R. S. Shannon, president of the Minnelusa Oil Corp., and Dana Mogan, of Los An-

(Continued on Page 138)

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Above—Ditchers; bottom one cut first half, and large ditcher cuts remaining half.

Below—Welders at work on joint of "Big-Inch" pipe line.

OKLAHOMA CONTRACTING COMPANY

DALLAS, TEXAS

LOUISIANA GULF COAST

Preparations Under Way to Test St. Landry Parish Wildcat

NEW ORLEANS, La. — Oil interest in coastal Louisiana continued this week to center largely on Sun Oil Co.'s wildcat, 1 A. T. Burleigh, in the Shuteston area of St. Landry Parish, where preparations were being made to perforate at 9,500-06 ft. and to conduct further tests. Oil and gas shows are reported to have been encountered at higher levels.

A new sand for the Cameron Meadows field, in Cameron Parish, was opened by Magnolia Petroleum Co. and Humble Oil & Refining Co. 39 Cameron Meadows Land Co., in 21-14s-13w. The well, bottomed at 5,493 ft., is flowing 117 bbl. daily through 8/64-in. choke from perforations at 5,396-5,400 ft.

The Ville Platte field, in Evangeline Parish, has been carried farther northward by Continental Oil Co. 1 Jaubert Brothers, in 26-3s-2e. The well, completed at a total depth of 10,290 ft., is producing 134 bbl. of distillate through 12/64-in. choke, along with 1,083,000 cu. ft. of gas.

Humble has obtained a short-term lease on the 85,000-acre Rockefeller wildlife preserve in Cameron Parish. The lease is to run for 100 days, beginning March 1, but upon expiration of the lease the state Mineral Board will offer it again for actual development. During its occupancy, however, it is understood Humble will conduct a geophysical exploration of the tract, and if it does not bid again it supposedly will be because its exploration has not revealed sufficiently favorable prospects. The company's bid for the 100-day lease was $89,350. Other major companies were bidders.

The Amerada Petroleum Corp. has staked location for a 10,000-ft. test, 2 T. B. Sellers, in the Bayou des Allemands field, St. Charles Parish, on a 40-acre drilling unit.

The deepest well now drilling in Louisiana is Superior Oil Co. 2 La Terre Oil Co., an east-extension test of the Lake de Cade field. The hole was around 12,400 ft., with indications that it would be carried to considerably lower levels if conditions continued favorable.

LOUISIANA GULF COAST COMPLETIONS

Fields

Bayou Choctaw, Iberville Parish: Solvay Process Co. 5 Wilbert, 52-9s-11e, dry at 775 ft.

Cameron Meadows, Cameron Parish: Magnolia and Humble 39 Cameron Meadows Land Co., 21-14s-13w, 117 bbl. through 8/64-in. choke, perf. 5,396-5,400 ft., T.P. 1,460 lb., gas-oil ratio 2,137, T.D. 5,493 ft.

Grand Bay, Plaquemines Parish: Gulf Grand Prairie Levee District A-13, 55-20s-18e, dry at 10,010 ft.

Hayes, Calcasieu Parish: Gulf 1-H Amoskeag Savings Bank, 18-11s-5w, 24.7 bbl. distillate through ¼-in. choke, T.P. 4,300 lb., gas-oil ratio 58,500, T.D. 11,960 ft.

Pine Prairie, Evangeline Parish: Gulf 4-A Thomas Schlicher Co., 3-4s-1w, 173 bbl. through 5/32-in. choke, perf. 7,722-28 ft., T.P. 625 lb., gas-oil ratio 866, T.D. 7,922 ft.

Schooner Bayou, Vermilion Parish: Union Oil of California 5-A Vermilion Parish School Land, 16-15s-1e, dual completion from perf. 5,964-96 ft. 162 bbl. through 10/64-in. choke, T.P. 0, C.P. 800 lb., gas-oil ratio 470; from perf. 6,410-18 ft. 194 bbl. through 10/64-in. choke, T.P. 650 lb., C.P. 0, gas-oil ratio 391, T.D. 6,440 ft.

Ville Platte, Evangeline Parish: Continental 1 Jaubert Bros., 26-3s-2e, 134 bbl. distillate through 12/64-in. choke, with 1,083,000 cu. ft. gas, T.P. 1,900 lb., C.P. 2,100 lb., T.D. 10,290 ft.

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TEXAS GULF COAST

Old Ocean Test Is Deepest Well East of Rocky Mountains

HOUSTON, Tex.—The deepest well east of the Rocky Mountains and the third deepest in the world was drilling below 13,837 ft. in Brazoria County this week. It is the J. S. Abercrombie and Magnolia Petroleum Co. B-1 McDonald, in the Old Ocean field. When the well was started it was planned to carry it to 14,000 ft. According to the operators, however, the original design may not be adhered to strictly. Progress of the hole has been uneventful, excellent drilling conditions having been experienced. "We are taking it slow and easy," it was explained.

The regular pay in the Old Ocean area is encountered around 10,000 ft. in the marine Hackberry section of the Frio. No log has been run in the B-1 McDonald; and there has been little coring. The crew is making hole at the rate of about 30 ft. daily.

Since 1939 the deep-well record in Texas had been held by Union Producing Co. 1 Minnie Brown, in the Agua Dulce field, Nueces County, which was completed at 13,728 ft. A matter of 1,170 ft. now separates the Abercrombie-Magnolia well and Continental Oil Co.'s test in Kern County, California, which established a world record at 15,004 ft. The Brazoria County test was started by Abercrombie and Harrison Oil Co., both independent producers of Houston, Tex. Harrison's half interest in the project was purchased later by Magnolia.

Cities Service Co. 1 Frank Stephens, in the P. K. Bartleson Survey, Colorado County, credited with being a pool opener, was still conducting tests at a total depth of 10,505 ft., plugged back to 8,993 ft. On the latest reported gage the well flowed for 5 hours through 7/16-in. choke at the rate of 194 bbl. of distillate a day, with 8,230,000 cu. ft. of gas, with perforations at 8,948-60 ft. Preparations were being made to kill the well as the week closed. The projected depth of this wildcat was 10,500 ft.

TEXAS GULF COAST COMPLETIONS

Wildcats

Brazoria County: Humble 1-B Houston Farms Development Co., Perry & Austin Sur. A-109, 620 bbl. through ¼-in. choke, T.P. 5,790 lb., gas-oil ratio 8,540, perf. 10,258-80 ft., T.D. 10,933 ft., P.B. 10,918 ft., discovery well.

Fields

Barbers Hill, Chambers County: Texas Gulf Producing Co. 6 J. F. Wilburn, William Hodges Sur. A-13, O.W.D.D. from 5,426 ft. to 5,704 ft., P.B. 5,605 ft., 260 bbl. through 5/32-in. positive choke, perf. 5,590-5,600 ft., T.P. 690 lb., S.I., C.P. 820 lb., gas-oil ratio 240.

Big Hill, Jefferson County: Stanolind 5 Mary E. Fitzhugh, E. Eaton Sur. A-22, dry at 8,500 ft.

Boling dome, Wharton County: Pan American Production Co. 1 R. E. Vineyard, S. F. Austin Sur. A-2, 72 bbl. through 10/64-in. choke, perf. 3,724-30 ft., T.P. 140 lb., C.P. 80 to 150 lb., gas-oil ratio 100, T.D. 4,012 ft.

Oyster Bayou, Chambers County: Sun 1 A. Middleton, A. Middleton Sur. A-440, dry at 8,604 ft.

Stewart, Jackson County: W. Stewart Boyle et al 2 Rose & Sample, G. Sutherland Sur. A-75, 41 bbl. through 3/32-in. choke, perf. 4,996-5,003 ft., T.P. 900 lb., C.P. 1,500 lb., gas-oil ratio 1,300, T.D. 6,010 ft.

Humble 1 B. Copsey, G. Sutherland Sur., 758,00 cu. ft. dry gas through ⅛-in. choke, perf. 4,996-5,003 ft., T.P. 1,900 lb., T.D. 5,001 ft.

Glenn H. McCarthy et al 1 E. C. Henkamer, B. A. Vacocu league A-53, dry at T.D. 9,373 ft., P.B. 6,600 ft.

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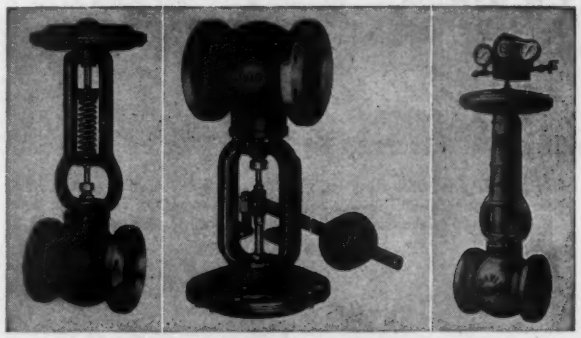

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OHIO, INDIANA, KENTUCKY

Clayton Pool May Be Extended Eastward by Large Producer

ZANESVILLE, Ohio. — The Wehrle Co. is drilling in what appears to be one of the largest oil wells in the Clayton pool. The well is located on the James Adrian et al tract in Section 4, and is ¼ mile east of present production, indicating a further extension of the pool to the east. The top of the sand was found at 3,350 ft., and as the hole is full of oil, drilling is proceeding slowly. The Kemrow Co. opened up a pool of limited extent by the completion of the John C. Duncan well in Section 10, Killbuck Township, Holmes County.

OHIO COMPLETIONS

Ashland County, Troy Township: Glen Harmon 1 E. A. Eaton, Lot 18, Clinton, dry, T.D. 2,482 ft.

Guernsey County, Oxford Township: Frank Stranges 1 C. R. Henderson, Sec. 23, Berea, 16,231 cu. ft. gas, T.D. 1,353 ft.

Holmes County, Killbuck Township: Kemrow Co. 1 John C. Duncan, Sec. 10, Clinton, 803,000 cu. ft. gas, T.D. 3,222 ft.

Morgan County, Marion Township: Bern O. & G. Co. 9 W. A. Huffman, Sec. 29, Berea, 35,000 cu. ft. gas, T.D. 1,714 ft.

York Township: Ohio Fuel 1 Harry Gibbs, Sec. 35, Berea, 178,000 cu. ft. gas, T.D. 1,176 ft.

Swingle et al 5 D. and V. Stoneburner, Sec. 30, Berea, 104,000 cu. ft. gas, T.D. 1,182 ft.

Stark County, Pike Township: Lyons et al 1 H. C. Witter, Sec. 3, Clinton, 425,000 cu. ft. gas, T.D. 4,834 ft.

Tuscarawas County, Sandy Township: East Ohio 1 Charles Reed, Lot 34, Clinton, 250,000 cu. ft. gas, T.D. 4,880 ft.

Washington County, Newport Township: Huth et al 8 Ella West, Sec. 29, Cow Run, 1 bbl., T.D. 525 ft.

Wayne County, Clinton Township: Ohio Fuel 2 Hettie Miller, Sec. 24, Clinton, 618,000 cu. ft. gas, T.D. 3,033 ft.

INDIANA

EVANSVILLE, Ind.—In Gibson County, the Superior Oil Co. is putting their 1 S. B. Thompson on pump after a 3,000-gal. acid treatment in the McClosky lime at 2,411-17 ft. The 1 Thompson is located 2½ miles northwest of Owensville, in NW SE NW 25-2s-12w, and about 6 miles from the nearest oil production. The latest reported production gage for the well was 287 bbl. of oil in 12 hours, swabbing and flowing.

Meanwhile, the same operators are drilling to set surface pipe on the 1 Braselton Comm., NW SW SE 24-2s-12w, about ½ mile north of the discovery well.

INDIANA COMPLETIONS

Daviess County: J. W. Cannon 4 Beck, SW NE SE 8-2n-5w, pumped 5 bbl., T.D. 640 ft.

Elkhart County: Clifford Vaughn 1 Orland, NW SE NW 24-38n-4e, dry at 661 ft.

Henry County: Knightstown Nat. Gas Co. 1 Mason, SW SE 31-16n-9e, 25,000 cu. ft. gas, Trenton 638 ft., T.D. 652 ft.

Pike County: Shell 1 Ella Thomas, SW NW NW 14-1s-8w, dry at 1,560 ft., McClosky 1,462 ft.

Posey County: Superior 32 New Harmony, SW NE NW 3-5s-14w, pumped 58 bbl., Cypress and Benoist, T.D. 2,851 ft., P.B. 2,774 ft.

Vanderburg County: United Oil 1 C. Walling, SW NW NE 32-6s-11w, pumped 20 bbl., Waltersburg sand 1,819-21 ft., T.D. 1,821 ft.

Superior 2 Nurrenbern, NE SW SW 32-6s-11w, dry at 1,445 ft.

Wayne County: Wayne Co. Prod. 1 F. Taylor, NW SW NE 22-13n-1w, dry at 3,330 ft., Jordan sand 2,116 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Eastern Kentucky drilling activities hit a lower level this week and no new locations were reported.

One oil well was reported complet-

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ed this week and one gas well was drilled in.

COMPLETIONS

Martin County: E. C. Ware et al 1 R. C. Preece farm No. 2, Wolf Creek, about 1 mile from the WPA road, 4 bbl. at 1,445 ft.

Floyd County: Kentucky-West Virginia Gas Co. 705 Keenas Akers et al, on Mud Creek, 238,000 cu. ft. gas at 2,992 ft. in shale.

WESTERN KENTUCKY

OWENSVILLE, Ky.—The P. O. Wall 1 W. H. Cabell-Crowder, outpost of the Smith Mills pool, has resumed drilling below 2,100 ft. after encountering some saturation of questionable commercial value in the Tar Springs sand at 1,961-63 ft. A core was cut from 1,961-68 ft., but only the top 2 ft. showed signs of oil. The 1 Cabell-Crowder is scheduled to drill to the McClosky unless saturation is encountered in formations above that depth.

The Carter Oil Co. has reported a 24-hour pumping gage of 101 bbl. of oil on their discovery near Robards, the 1 S. T. Denton. The pay in the well is the Benoist sand at 2,356-64 ft. The same operators 2 S. T. Denton is still waiting for cable tools to drill in. The 1 Jennie Denton, 1,320 ft. north of the discovery, is drilling in the Benoist sand at 2,361 ft. after topping the sand at 2,348 ft. The hole is reported to have been reduced and casing will probably be set after electric log is run.

MICHIGAN

Production Falling Below PAW Allocation

SAGINAW, Mich. — Reporting the federal office of petroleum administrator for war has recommended a daily allowable of 63,700 bbl. from Michigan oil wells in March, P. J. Hoffmaster, state supervisor of wells, said today it is unlikely the quota, which is the same as for January and February, would be reached either this month or next. Unfavorable weather, particularly heavy snow and severe cold in recent weeks has made field operations difficult.

The quota exceeds actual January production by nearly 6,500 bbl. The Michigan Oil and Gas Association reported January output averaged 57,297 bbl. a day, for a total of 1,776,207 bbl. during the month. Daily average output for December was 60,203 bbl. The Reed City field, down about 1,450 bbl. a day, nevertheless increased its producing leadership, accounting for 25,683 bbl. a day, last month.

The weather also hindered start of new operations last week as the state Conservation Department issued only four drilling permits. Nine tests were completed, five being dry holes. Best of the producers is a Richmond-Osceola well which pumped 109 bbl. the first 16 hours after being acidized. Dry holes included two Roscommon Township, Roscommon County, wildcat deep tests.

MICHIGAN COMPLETIONS

Bay County, Kawkawlin Township: Gulf 1 McNally, N½ NW SE 28-15n-4e, pumping 10 bbl., acidized, T.D. 2,948 ft.

Gladwin County, Billings Township: P. J. Bolger and Eugene Hilliard 1 State, N½ NW SE 13-17n-1e, wildcat, dry, T.D. 3,652 ft.

Osceola County, Lincoln Township: J. E. Flanigan 1 Curtiss, N½ SW SE 29-18n-10w, wildcat, dry, T.D. 1,705 ft.

Richmond Township: E. L. Bennight 1 Gable, N½ NE NW 6-17n-10w, pumped 109 bbl. first 16 hr. after acid, T.D. 3,620 ft.

Ottawa County, Tallmadge Township: C. J. Farley, Tr., 1 Rankans, NE SE SE 15-7n-13w, pumping 10 bbl., acidized, T.D. 1,885 ft.

Roscommon County, Roscommon Township: Freeman Oil Co. C-1 State-Roscommon, N½ NE 21-21n-3w, wildcat, dry, T.D. 4,160 ft.

Mogul Oil Co. 1 Hartwick, S½ SE SW Sec. 25, wildcat, dry, T.D. 3,987 ft.

Van Buren County, Bangor Township: Harris Oil Co. 1 Smith, SW SE SE 8-2s-16w, dry, T.D. 1,061 ft.

Socony-Vacuum Oil Co., Inc., 1 Adaskevich & Madsen communitized, SW SW SW Sec. 9, pumping 15 bbl., natural, T.D. 1,074½ ft.

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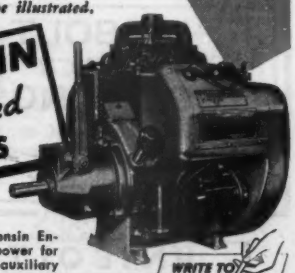

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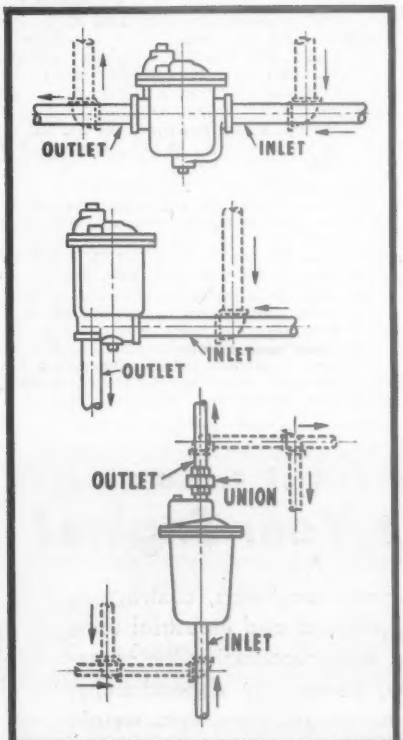

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APPALACHIAN FIELDS

Weather Slows Development In Eastern Fields

PITTSBURGH, Pa.—Completions in the lower eastern fields reached a new low during the past week which is mostly due to the extreme cold and snow. Subzero weather prevailed throughout the week. None of the deep wildcats reached important markers.

SOUTHWEST PENNSYLVANIA

In Maryland, William E. Snee et al are drilling at 6,430 ft. in old 1 Speicher on the Accident dome in Garrett County and in gray shale with a streak of brown shale passed through. On Laurel Ridge, the deep test of New Penn Development Co., William E. Snee et al remains shut down at 7,276 ft. on the John and Eleanor Beck farm pending further study of the directional survey of the hole.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Greene County, Center Township: Walter Messing et al 2 John Evans, dry through Bayard and Elizabeth sands, T.D. 3,602 ft.

WEST VIRGINIA

The deep test of Godfrey L. Cabot, Inc., on the Daniel Matheny farm in Union district, Mason County, is listed as a dry hole and is being plugged. The Corniferous lime was topped at 4,179 ft., Oriskany at 4,259-73 ft., base of Devonian-Silurian lime at 5,199 ft., Big Six (Newburg) at 5,121-92 ft., and Clinton at 5,496-5,518 ft., total depth 5,810 ft.

The test of the United Fuel Gas Co. 5134 W. W. Shinn in Ripley district, Jackson County, is still producing oil from the Oriskany which also shows some gas. It appears to be producing more than any recent oil strikes in the Oriskany and flows the oil.

WEST VIRGINIA COMPLETIONS

Calhoun County, Sherman district: Bowser Gas Co. 4 Edith Z. McDonald, 2 bbl., Big Injun sand, T.D. 2,156 ft.

Kanawha County, Malden district: North Eight Producing Co. 1 Ann C. Winfree, 42,000 cu. ft. gas, Big lime 1,123 ft., Injun 1,281-1,336 ft., T.D. 1,885 ft.

Ritchie County, Grant district: Schultz Oil Co. 11 T. C. Hammett, 40 bbl., Squaw sand, T.D. 1,900 ft.

Wetzel County, Grant district: Pittsburgh & West Virginia Gas Co. 1 Nampeco Corp., drilled deeper, 840,000 cu. ft. gas, Big lime 2,178 ft., Big Injun 2,230 ft., gas from Bayard, T.D. 3,370 ft.

Carnegie Natural Gas Co. 6 Wilson Ney hrs., 4 bbl., Injun sand, Big lime 2,013 ft., Big Injun 2,100 ft., T.D. 2,440 ft.

ORISKANY GAS FIELDS

Jackson County, Washington district: United Fuel Gas Co. 5113 Sadie Castro, 6,367,000 cu. ft. gas, Big lime 1,830 ft., Berea 2,425 ft., Corniferous lime 5,020 ft., Oriskany 5,129 ft., T.D. 5,142 ft.

Putnam County, Union district: West Virginia Gas Corp. 1 A. R. Bailey, 3,181,000 cu. ft. gas, Corniferous lime 5,057 ft., Oriskany 5,140 ft., shot 5,152-77 ft., T.D. 5,177 ft.

OKLAHOMA

Payne County Wildcats Open Three New Fields

PAYNE County had two new oil discoveries and prospects of a new gas field as the week ended. Stanolind and Amerada's 1 Ingham, Misener sand discovery, SW NW SE 28-20n-4e, flowed 230 bbl. of oil in 18 hours through perforations in the sand at 4,031 ft. Originally a Wilcox test, the well was drilled to the second Wilcox at 4,156 ft., which was dry. Casing was then perforated in the Misener zone where showings of oil were found while drilling through.

West of the Cushing area, Oklahoma Gasoline Plants, Inc., 1 Potts, NW SE NW 9-18n-6e, made a natural flow of 200 bbl. in the Wilcox sand at 3,569-95 ft. Additional production tests are under way. Location is in an old producing area and on a seismograph structure of several hundred acres. Operators are confident of a high per-acre recovery.

The gas well, which will be carried on to the Wilcox, was Thomas N. Berry 1 Berry, NW SE SE 26-19n-2e, 5 miles west of the Stillwater pool and about 6 miles northeast of Ramsey. Operators made a 40-minute drill-stem test at 4,061-70 ft. in Skinner sand which showed for approximately 10,000,000 cu. ft. of gas a day. There was no water in the hole and gas pressure was increasing when the well was closed in.

OKLAHOMA COMPLETIONS

Wildcats

Jefferson County: Seitz, Comegys & Seitz 1 W. Seay, SW NW NE 32-6s-5w, dry, T.D. 2,003 ft.

Oklahoma County: Kerlyn et al 1 Jenkins, NE NE SW 28-13n-3w, dry, T.D. 6,907 ft., Layton 4,590 ft., Avant 4,740 ft., Oswego 6,180 ft., Hunton 6,475 ft., Sylvan 6,605 ft., Viola 6,718 ft., dolomite 6,820 ft.

Pottawatomie County: Stanolind-Amerada 1 Bleeker, NW SE SW 28-10n-2e, flowed 347 bbl., Wilcox 5,877-85 ft., T.D.

Fields

Avant, Osage County: Sinclair Prairie No. 69, SE SE NE 19-23n-12e, repressure well, T.D. 1,728 ft.

Cumberland, Marshall County: Pure 2 Little-211, SE NW NE 34-5s-7e, flowed 1,320 bbl., sand 5,748-5,861 ft., T.D. 5,871 ft.

Drumright, Creek County: Sinclair Prairie 32 Jones, S½ S½ NW 3-17n-7e, pumped 42 bbl., Bartlesville 2,535-2,654 ft.

Edmond, northeast, Oklahoma County: Harper-Turner 1 Keil, SE SW 8-14n-2w, flowed 38 bbl., sand 5,860-90 ft., ½-in. choke.

Fuhrman, Hughes County: Midco 1 Capps, NE NE SW 27-9n-9e, dry, T.D. 4,314 ft., Wilcox 4,255 ft.

Keystone district, Tulsa County: Johnson Oil & Ref. 9 Bailey-Grimes, SE NW SW 31-19n-10e, pumped 15 bbl., Red Fork 2,234-75 ft., T.D. 2,290 ft.

Oklahoma County: Continental 1 Ethridge, NE NW SW 22-12n-3w, pumped 132 bbl., Wilcox 6,468-6,533 ft.

Tonkawa, Kay County: Ingling & Parker 5 State, NE SE NW 36-25n-1w, dry, T.D. 2,100 ft.

Turkey Mountain, Tulsa County: J. L. Reynolds 1-A fee, SW SW NE 1-18n-12e, pumped 25 bbl., Turkey Mountain sand 2,204-10 ft.

Walker, Creek County: Marshall Strozier 1 Pinihill, SE NW SE 16-17n-9e, swabbed 35 bbl., Bartlesville 2,490-2,508 ft., T.D. 2,514 ft.

Wewoka Townsite, Seminole County: A. R. Jordan 1 Jennings, N½ NW SE 8-8n-8e, pumped 45 bbl., Hunton 3,964-81 ft., T.D. 4,304 ft.

Miscellaneous

Creek County: Skelly 1-B Fife, NW NE SE 15-14n-8e, dry, T.D. 4,173 ft., Wilcox 3,770 ft.

C. A. Thomas 2 Cohn, dry, T.D. 2,900 ft., Oswego 2,804 ft.

Osage County: Devonian Oil No. 1, SW NW NW 24-23n-7e, dry, T.D. 2,675 ft., Burgess sand 2,669 ft.

Cities Service No. 489, SE NW NE 14-29n-10e, dry, T.D. 1,890 ft., chat 1,850 ft.

(Continued on Page 138)

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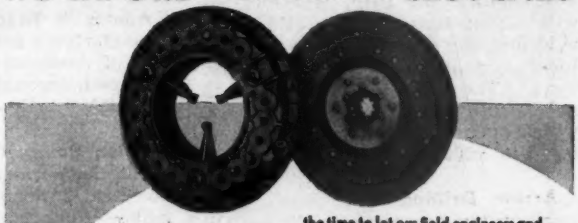

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Among the Drilling Contractors

Baldridge & King, McAllen, Tex., have started work on a test, 1 Francisco Alvarado, to be drilled for Sun Oil Co. in Survey 553, 3½ miles northeast of the Rincon field, in Starr County, Texas.

B. & C. Well Servicing Co., Houston, Tex., was moving in last week for a workover job on a well in the South Cotton Lake field, Chambers County, Texas, owned by J. R. Turnbull.

George H. Echols, Houston, Tex., has staked location for a wildcat which he will drill for his own account in the Convent area of St. James Parish, Louisiana. The well, projected to go 10,500 ft., is 1 Realty Operators. Mr. Echols brought in the first coastal Louisiana discovery in 1943 with his 1 Kessler & Sternfels, in the Napoleonville area of Assumption Parish.

Henshaw Brothers, San Antonio, Tex., contracting firm, is associated with Great Lakes Carbon Co. in a wildcat to be drilled 7 miles north of Inez, just inside Victoria County, Texas. The well, 1 Joe Wray, is 12 miles southwest of the Texas Co. well which opened the Collier field. It is to go to 3,000 ft.

Arrow Drilling Co., Tulsa, is at work on two contracts for Fifteen Oil Co., opening up deep production in the Charenton Beach area of St. Mary Parish, Louisiana. One is 3 South Coast, now at 9,100 ft., and the other is 4 South Coast, drilling at 7,400 ft.

Golding-Farris Drilling Co., Houston, Tex., was waiting on surface pipe at a wildcat well, 1 Clare Driscoll, which it is drilling for Stanolind Oil & Gas Co., in the T.&N.O. Survey, 5 miles northwest of the Fitzsimmons field, Duval County, Texas. The same contractor has started work on a semiwildcat for Stewart Boyle et al near Ganado, Jackson County, Texas, about 4 miles from production.

C. J. Davidson, Fort Worth, Tex., has been awarded contract for Skelly Oil Co. 1-K University, Section 28, Block 9, University Land, a 7,500-ft. wildcat test 2½ miles northeast of the Emma pool, in southern Andrews County, Texas. Water well was being drilled and contractor was moving in for the start.

Hollandsworth Drilling Co. has staked location and was moving in for its 1 Harrison Baker, 2½ miles southwest of the discovery well in the Weiland Woodbine sand pool of southeast Hunt County, Texas. Hollandsworth drilled the discovery well in the Weiland pool and is moving in rig from the W. F. Nenny 1 Wise, latest producer in the Weiland which extended the pool one location to the east.

W. W. Zimmerman, contractor, was moving in to start Ike Howeth 1 Cafferelli, Starr County, Texas, wildcat in the southeast corner of Share 19-C, De la Garza Falcon Porcion 89.

Zephyr Drilling Co., Tulsa, set 246 ft. of surface casing in N. Appleman & Co. 1 Long, W½ NW SW 10-26s-12w, a wildcat 5 miles northeast of the Iuka pool in Pratt County, Kansas.

Adams & Bradley, Midland, Tex., have started a new well in the Emma pool of Andrews County, Texas, for their own account. It is scheduled for 4,300 ft.

Union Rotary Co., Mount Pleasant, Mich., has contract for Gordon Oil Co. et al 2 Reames, 26-22n-6w, Missaukee County, Michigan.

Crow Drilling Co., Shreveport, La., has contracted to drill F. R. Sylvester 1 Haynes, a wildcat test in Section 24-23n-9w, Webster Parish, Louisiana.

George P. Livermore, Inc., Lubbock, Tex., has announced location for a wildcat test in southeastern Hockley County, 2 miles east of Ropesville and 6 miles northwest of a dry hole drilled by Livermore in southwestern Lubbock County, Texas, last year.

S. C. Herring, Abilene, Tex., has announced location for a north outpost to the Wimberly pool of Jones County, Texas.

McQueen & Clevenger, Fort Worth, Tex., have moved in heavy rig for Humble Oil & Refining Co. 1 Tannehille, 7,500-ft. test 3½ miles west of the Wasson pool in Yoakum County, Texas.

Big Chief Drilling Co., Oklahoma City, Okla., is drilling at about 3,000 ft. on a deep test in southwestern Wise County, Texas, for Youngblood & Foree.

J. R. Sharp, Tulsa, is preparing to drill his fifth well on the Halley ranch, Weiner pool, Winkler County, Texas.

Drilling & Exploration Co., Hobbs, N. M., and Dallas, Tex., has finished 3 G. W. Davis in the Wasson pool, West Texas, and is starting 1 Bowen on a Humble farmout in the same pool.

Delta Drilling Co., Tyler, Tex., is completing a nice well for its own account on the east side of the new Quitman pool of Wood County, Texas. which was opened by Delta late last year at its No. 1 Goldsmith, northwest of Quitman.

S. B. Roberts, Abilene, Tex., is completing a well at a total depth of 3,411 ft. in Palo Pinto lime in the Strand pool, Haskell and Jones counties, Texas, 7 miles east of Stamford. Roberts recently revived interest in the area when he completed 1 Strand for 100 bbl. per hour, largest well in the pool.

Lupher Drilling Co. has been awarded contract to drill Pure Oil Co. A-1 Edward Bulman, C W½ NE SE 30-20n-6w, Clare County, Michigan.

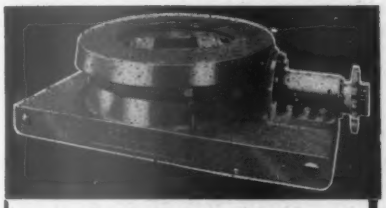
Phinney Brothers have the contract to drill Fisher-McCall Oil & Gas Co. 1 Brandt and Vankovering (Comm.), C SW SE 30-5n-13w, Ottawa County, Michigan.

Bill Rapp, of Shawnee, Okla., had contract on the Danciger Oil & Refining Co. and Fau-Kern Development Co. 1 Rinehart, in C NE NW 21-20n-7e, Pawnee County, Oklahoma, which drilled to 2,763 ft. in watery Bartlesville, plugged back, and will shoot in the Skinner sand at 2,578-84 ft., where the well showed for 12 to 15 bbl. of oil a day.

Hugh Hodges has the drilling contract on Magnolia Petroleum Co. 1 Heller-Petro, in NW SW SE 28-10n-2e, east offset to the pool discovery in Pottawatomie County, Oklahoma, and had set 500 ft. of surface pipe.

R. S. Meadows has the contract on Southern Oil & Gas Co. 8 Muslow, in SE NW 5-20n-15w, the Pine Island area, Caddo Parish, Louisiana. Test has spudded.

F. W. Dillard, Monahans, Tex., has been awarded contract for Belfort Oil Co., Dallas, 1-W University, a 3,500-ft. semiwildcat test ¾ mile southeast of the Pyote pool in North Central



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Ward County, Texas. The test is on a farmout from the Texas Co., comprising the northeast quarter of Section 14, Block 16, University Land. The test is supported by Cities Service Oil Co., Skelly Oil Co., Stanolind Oil & Gas Co., Atlantic Refining Co., and Mascho Oil Co.

Batson Drilling Co., Ardmore, Okla., has contracted to drill Mudge Oil Co. 1 Tanner, NE SE 6-6s-2e, near Overbrook in northern Love County, Oklahoma. The wildcat test, supported by Sinclair Prairie Oil Co., Tide Water Associated Oil Co., Sun Oil Co., F. W. Merrick, Inc., and Lloyd Noble, is projected to 4,500 ft.

Smith Brothers Drilling Co. has the contract on G. M. Piggott and T. N. Law 1 Coley, in C NW SE 10-10n-1e, south of Newalla in the northeast corner of Cleveland County, Oklahoma. The test was drilling below 1,250 ft.

N. H. Wheeles Drilling Co., Shreveport, La., has contract for Carter Oil Co. 2 Highland Farms, Section 12-6n-4e, La Salle Parish, Louisiana, in the Cypress Bayou area. Contract calls for drilling to the Wilcox.

Lon H. Cron, Houston, Tex., is starting work on 1 E. O. Swanson, a wildcat test for Continental Oil Co., 9 miles northeast of Louise, in Wharton County, Texas. This contractor last week finished 10-B Clara Driscoll, in the Driscoll field of Duval County, Texas, for Continental and was skidding rig to begin 11-B for the same company.

Harry L. Edwards Drilling Co., Houston, Tex., has set surface pipe at 812 ft. at Kirby Petroleum Co. 2 Daniels, in the North Houston field of Harris County, Texas. Projected depth is 7,300 ft. The same contractor is below 6,200 ft. on Phillips Petroleum Co. 1 Annie B. Renchie, in the Millican area of Brazos County, Texas, a wildcat test.

Ashby Drilling Co., Mount Pleasant, Mich., has contracted to drill Gulf Refining Co. 2 Bunning, 35-22n-6w, Missaukee County, Michigan.

W. G. Ray Drilling Co., which is drilling a wildcat on its own account in Lafayette County, Arkansas, was drilling below 2,200 ft. at its 1 Warnock-LeCroy, in 3-20s-24w.

Troup-Moore Drilling Co. has started a test on the Harber tract in C SE NE 10-10n-7e, Seminole County, Oklahoma.

Franklin Drilling Co. has the contract on Ohio Oil Co. 1 Burns, in SE NE SW 17-3n-2e, in the southeastern part of Garvin County, Oklahoma. The test is scheduled to go to the Arbuckle zone.

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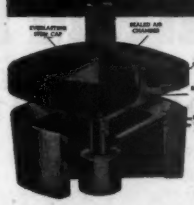

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Kansas Pipe-Line Runs Hit an All-Time High

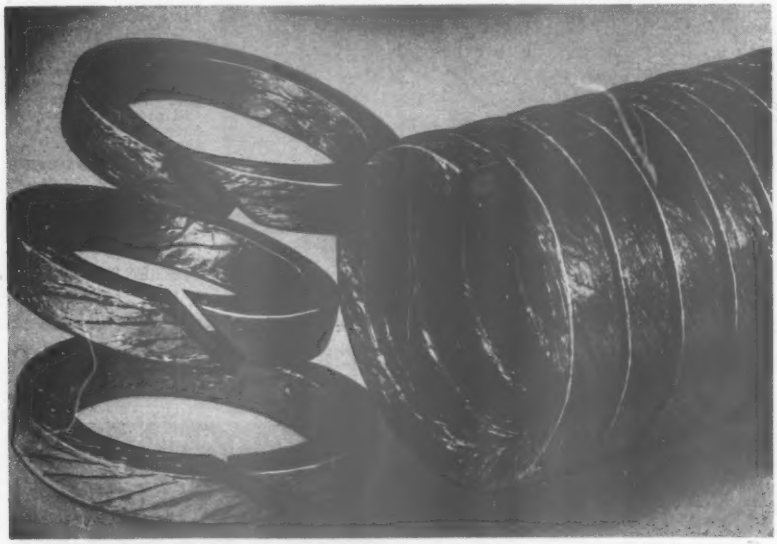
KANSAS completions for the week included 13 oil wells having a total potential of 9,804 bbl. There was 1 gas well and 15 dry holes. There were 27 new locations staked, a good indication of a continued steady trend.

While the number of wildcats showing for possible pool openers was at a low, in comparison with recent weeks, production for the state reached an all-time high of 316,650 bbl., an increase of 16,800 bbl. over the preceding week and over 5,000 bbl. greater than the previous high set in November 1942.

Three-fourths of a mile southwest of the Lindsborg Viola lime pool, Dickey Oil Co. was reported to have filled 500 ft. with oil after drilling to 3,887 ft. in Arbuckle dolomite. Mississippian chat was topped at 2,932 ft. and the dolomite at 3,381 ft. The well is the 1 Frantz, W½ SE SE 24-17-4w. Cellar and pits were being dug for the 2 Frantz, a north offset.

Two wells opening new pools were completed last week. The Northeast Ray pool in Phillips County was opened by Cities Service Oil Co. at its 1-C Hansen, SW SW SE 15-4s-20w, with an initial potential of 1,626 bbl. in Lansing at 3,363-71 ft. Total depth was 3,799 ft., plugged back to 3,396 ft.

North of Iuka and west of the new Carm pool in Pratt County, Skelly 1-B Knop, SW SW SE 25-26-13w, made initial potential of 1,629 bbl. in Arbuckle lime at 4,339-41 ft. The well flowed by heads and on swabbing tests made 30 bbl. of oil an hour.



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KANSAS COMPLETIONS

Barton County: Champlin Ref. 1 Hagan, SE SE NW 27-20-11w, dry, T.D. 3,376 ft., Lansing 3,085 ft., conglomerate 3,226 ft., Arbuckle 3,346 ft.

Bartlett & Crum 1 Schartz, NW NW NE 34-19-12w, dry, T.D. 3,446 ft., Lansing 3,126 ft., conglomerate 3,377 ft., Arbuckle 3,396 ft.

Vernon Oil & Gas 1 Eveleigh, SE NW SE 16-18-13w, dry, T.D. 3,382 ft., Lansing 3,073 ft., conglomerate 3,309 ft., Arbuckle 3,332 ft.

Greenwood County: Dunn & Lewis 1 Arnold, NE NW 9-26-13w, dry, T.D. 1,830 ft., Bartlesville 1,465 ft., Mississippi lime 1,522 ft.

Phillips County, discovery of Northeast Ray: Cities Service 1-C Hansen, SW SW SE 14-5-20w, potential 1,626 bbl., 36.6 gravity, Lansing 3,363-71 ft., T.D. 3,799 ft., P.B. 3,396 ft.

Pratt County, discovery: Skelly 1-B Knop, SW SW SE 25-26-13w, potential 1,629 bbl., flowed by heads, swabbed 30 bbl. an hr., Arbuckle 4,339-41 ft.

Reno County: Falcon-Seaboard 1 McCalla, NE NE NE 24-25-10w, dry, T.D. 4,340 ft., Lansing 3,425 ft., Mississippi lime 3,888 ft., Viola 4,129 ft., Simpson 4,230 ft., Arbuckle 4,204 ft.

Rooks County: Cities Service 1 Gregory-Post, NW NE NW 3-8-16w, dry, T.D. 3,810 ft., Lansing 3,170 ft., conglomerate 3,529 ft., Simpson 3,745 ft., Arbuckle 3,777 ft.

Saline County: Phil-Han 1 Tinkler, SE SE NW 26-15-1w, dry, T.D. 3,390 ft., Misener 2,943 ft., Hunton 2,950 ft., Sylvan 3,093 ft., Viola 3,193 ft., Simpson 3,247 ft., Arbuckle 3,356 ft.

Branine & Goering 1 Linshield, NE NE SE 34-16-4w, dry, T.D. 3,904 ft., Misener 3,638 ft., Viola 3,694 ft., Simpson 3,794 ft., Arbuckle 3,869 ft.

Fields

Albert, Barton County: Aylward Production 3 Wissman, C NW 31-18-15w, flowed 58 bbl., Lamotte sand 3,565-3,604 ft.

Bemis, Ellis County: Cities Service 1 Hauser, E½ SE NW 34-11-17e, 2,789 bbl., Arbuckle 3,605-09 ft.

Curtis, Stafford County: Skelly 1 George Schmid, S½ NW SW 5-22-13w, pumped 341 bbl., Arbuckle 3,713-20 ft.

Davidson, Russell County: Adair & Morton 1 Chegwidden, N½ SE SW 28-15-11w, dry, T.D. 3,219 ft., Arbuckle 3,199 ft.

Greenvale, Russell County: Cities Service 1 Kejr, S½ SE NW 33-14-12w, pumped 43 bbl., Gorham 3,184-89 ft., T.D. 3,210 ft.

Henderson, Cowley County: Earl Wakefield 1-A O'Neil, NE NE 27-32-3e, pumped 15 bbl., Arbuckle 3,440-48 ft.

Hugoton, Haskell County: United Producing 1 Huxman, NW NW SE 27-29-34w, 10,874,000 cu. ft. gas, limestone 2,560-2,750 ft.

Karber, Barton County: Max Cohen 2 Rick, E½ NW NE 12-19-11w, pumped 324 bbl., Arbuckle 3,348-62 ft.

Kraft-Prusa, Barton County: Black-Marshall 4 Krier, SE NE NW 18-16-11w, 2,271 bbl., Arbuckle 3,296-3,309 ft.

Lake City, Barber County: Pryor & Lockhart 2-A Gant, SW SW SE 7-31-13w, pumped 201 bbl., 47.5-gravity, Simpson 4,557-71 ft.

Lost Springs, Marion County: Derby Oil and Crow Drilling Co. 2 Watson, NE SE 29-17-4e, dry, T.D. 2,430 ft., Mississippi lime 2,406 ft.

McPherson, McPherson County: Auto-Ordnance 1-A Nordling, SE NE SW 19-18-2w, dry, T.D. 3,271 ft., Viola 3,265 ft.

Rahn, Cowley County: Lindsay and Simpson 1 Waldschmidt, E½ NE NE 14-34-5e, dry, T.D. 2,945 ft., Bartlesville 2,929 ft.

Rice County: Harwood Oil 2 Proffitt, NW NW 25-19-10w, dry, T.D. 3,317 ft., Arbuckle 3,305 ft.

Shutts-Ellis County: Phillips 2 Kessler, S½ SW SE 32-11-17w, pumped 37 bbl., Arbuckle 3,612-18 ft.

(Continued on Page 143)

CANADIAN FIELDS

Official Figures Show Small Production Increase in 1942

CHATHAM, Ont. — Crude and natural-gasoline production from all Alberta fields for the week ending February 8 averaged 26,596 bbl. daily compared with 26,852 bbl. daily for the preceding week and 29,745 bbl. daily for the corresponding week last year. The daily average included 25,199 bbl. of crude and 1,113 bbl. of natural gasoline from Turner Valley and 284 bbl. of crude from outside fields.

Official figures just issued show that Alberta crude petroleum production in December, including natural gasoline, amounted to 841,860 bbl., bringing the 1942 total to 10,143,270 bbl. This compares with the 1941 total of 9,905,779 bbl. The year's production for 1942 averaged 27,790 bbl. daily, an increase of 643 bbl. over the 1941 daily average. The December daily average, however, was down 835 bbl. compared with the daily average for the same month of 1941.

Natural gasoline, included in the foregoing totals, from four Turner Valley absorption plants which processed 98,257,000 cu. ft. daily in December, was 34,512 bbl. for the month and 302,216 bbl. for the year 1942.

Natural-gas production in December was 5,515,344,000 or 177,714,000 cu. ft. daily, an increase of 9,121,000 daily over November, due to increased seasonal demand, but a decrease of 18,686,000 daily from December 1941, due to more efficient operation of Turner Valley wells. Although use of gas for fuel increased considerably over 1941, the total production for the year was 154,797,000 cu. ft. daily, a decrease of 16,354,000 cu. ft. daily from the previous year, due to more efficient operation and reduction of wastage.

Crude production by fields for December, and for the comparative years 1941 and 1942 is as follows (in barrels):

Field—	Dec.	1941	1942
Turner Valley:			
Shallow crude	444	6,014	5,806
Limestone crude	795,328	9,504,111	9,668,263
L'stone naphtha	2,770	27,096	27,650
Nat. gasoline	34,512	293,122	302,216
Red Coulee	825	11,626	10,107
Wainwright	1,295	11,773	14,510
Vermilion	1,651	20,499	63,793
Taber	4,778	4,655	29,819
Del Bonita	115	4,908	1,835
Tilley			5,718
Lloydminster		416	477
Steveville	142	18,707	10,478
Dina-Ribstone		2,854	2,780
Total	841,860	9,905,779	10,143,270

In addition, mining operations for recovery of oil in the tar sand area produced, during the year, 10,041 bbl. from 11,156 tons of sand. Owing to weather conditions, operations were not carried on in December.

TURNER VALLEY COMPLETIONS

North extension: Home Oil 12, LSD 9, 5-21-3w5, T.D. 9,019 ft., Madison at 8,555 ft., P.B. to 8,805 ft., acidized with 16,250 gal., I.P. 522 bbl. daily of 40° crude, with 1,747,000 cu. ft. of gas.

North Turner Valley: Royalite Oil 68, LSD 10, 22-20-3w5, T.D. 7,216 ft., Madison at 6,616 ft., I.P. 395 bbl. daily.

West-Central section: Royalite Oil 69, LSD 8, 35-19-3w5, T.D. 7,895 ft., Madison at 7,476 ft., acidized with 6,300 gal., I.P. 463 bbl. daily of 39.9° crude with 432,000 cu. ft. of gas.

Sullivan Creek Prospect

The Sullivan Creek area, about 15 miles southwest of Turner Valley, is being tested by a syndicate which took over 19,000 acres on a permit held by Walter S. Campbell of Edmonton. Test is being financed jointly by Anglo-Canadian Oil Co., Petroleum Corp. of Canada, Sunset Oils, Alberta Pacific Consolidated Oils, McDougall-Segur Exploration Co., Highwood Sarcee Oils and Anaconda Oil Co. and operations are supervised by Drilling Contractors, Ltd., of Calgary. The area has been recently geologized by C. O. Hage of the Geological Survey of Canada and by independent geologists. The structure is about 20 miles in length with a width of from 2 to 4 miles. Sullivan Creek 1, LSD 12, 25-17-5w5, spudded in December and is below 800 ft. after setting 13⅜-in. casing at 516 ft. At this depth two fair gas shows had been encountered. The test entered the Fernie shale around 725 ft. and is expected to get the Madison limestone a little below 1,000 ft. with prospects of two and possibly three porous zones in the Madison, and a further porous zone in the Devonian limestone, which is expected at 3,000 ft.

Wildcat Hills Test

Imperial Oil has located a new test in the Wildcat Hills area, southeast of Grease Creek. Location is in LSD 16, 30-27-5w5, north and west of Calgary. Two deep tests in the Grease Creek area encountered favorable showings and furnished geological information for locating the Wildcat Hills test.

Walton Creek Operations

An important wildcat test will be started this spring by Home Oil Co. and Anglo-Canadian Oil Co. in the Walton Creek area, in the foothills north and west of Calgary. Location was made and derrick erected last fall in LSD 3, 12-33-8w5, and drilling equipment is now being moved in.

Armelgra Oil Show

In the Armelgra area near Vauxhall, in the southern Alberta plains area, Imperial-Armelgra 1, LSD 16, 19-13-13w4, bottoming around 3,130 ft., is drilling out cement preparatory to testing a show of heavy crude. Location is somewhat south and west of the Tilley field. Imperial-Grantham 1, LSD 1, 29-13-15w4, still farther to the west, has been abandoned around 3,216 ft.

Athabaska Prospect

Davies Petroleums and East Crest Oil Co. are preparing to start work on their first joint test in the Athabaska area of northern Alberta, where tentative location has been made in LSD 1, 4-66-22w4. Location is not far from Athadome Oils 2, drilled in 1933. The Athadome well encountered a 26-ft. oil sand at 1,640 ft., indicating a fair commercial production of heavy crude. The log also showed a sand corresponding to the Viking sand of east-central Alberta, with substantial quantities of clean, dry gas. The oil sand was not given a definite test, the operators deepening to the Madison limestone and later abandoning work owing to financial conditions. Equipment for the new test is being moved to location.

ILLINOIS FIELD REPORT

Tar Springs Forms Second Pay Horizon in West Inman Field

MATTOON, Ill.—The first test of the Tar Springs sand made in the West Inman pool of Gallatin County, about 2½ miles northeast of Ridgway, is showing for about 60 or 75 bbl. of oil a day. The pay zones in the Ivan Green 1 Grant, SE NE NW 15-8s-9e, were found from 2,170-95 ft. and 2,200-10 ft. Other wells in the area showing saturation in the Tar Springs sand are the Globe Oil & Refining et al 1 Frank Hish Comm., SE NE SE 16-8s-9e, where saturation was encountered from 2,214-33 ft., but casing was set to test saturation in the Cypress sand at 2,502-10 ft. and 2,512-21 ft. A test is now being made of the Cypress.

The Nelson Development Co., a subsidiary of the Barnsdall Oil Co., has taken over the operating of the 1 Reid, SE SW NW 16-1s-10e, and set casing for a further test of saturation found in the McClosky lime at 3,325-31 ft. About 2½ miles northwest of Albion, and about 4 mil from the nearest oil production, it is a wildcat showing signs of making a commercial oil producer. The 1 Reid was drilled by the Stanolind Oil & Gas Co., but they did not choose to set casing and made a deal with the Nelson Development Co. to complete the well. Plug is now being drilled for preliminary tests.

The Deep Rock Oil Co. has set casing to test what is hoped to be the McClosky limestone in the 1 Jess Anderson, SW NW 35-2s-5e, 2 miles southwest of Wayne City. The well has not been drilled through the McClosky zone as yet, but is evidently running structurally high enough to produce. The total depth of the hole at present is 3,314 ft., and it will be deepened with cable tools as soon as the cement has set. The test is 6 miles southwest of the Sims pool.

The William Marlowe et al 1 Ralph, S½ NE NE 27-15n-2w, Christian County wildcat that opened a new Devonian pool in the northern part of the basin, is said to be pumping at the rate of 32 bbl. of oil every 12 hours. This is all the well is reported capable of producing since it pumps down in about 12 to 14 hours. Operators are pumping the well durin the daytime only.

ILLINOIS COMPLETIONS

Wildcats

Fayette County: J. Youngblood 1 A. Smith, NW SW NE 24-6n-1e, dry at 1,924 ft., Menard 1,192 ft., Vienna 1,286 ft., Tar Springs sand 1,318 ft., Glen Dean 1,391 ft., Barlow 1,532 ft., Weiler 1,648 ft., Aux Vases sand 1,763 ft., Ste. Genevieve 1,823 ft., McClosky 1,864 ft.

Franklin County: Smokey Oil 1 Interstate Coal, NE NE NE 23-7s-2e, dry at 2,276 ft., Menard 1,948 ft., Vienna 2,064 ft., Tar Springs sand 2,098 ft., Glen Dean 2,174 ft., Hardinsburg sand 2,273 ft.

Richland County: Pure 1 A. M. Earnst, E½ NW NW 31-3n-9e, pumped 8 bbl., natural, McClosky 2,990-93 ft., T.D. 3,005 ft.

Shelby County: C. R. Winn 1 Cuttler, SE SW NE 12-10n-2e, dry at 1,714 ft., Glen Dean 1,423 ft., Cypress 1,544 ft., Cypress sand 1,565 ft.

Wabash County: N. V. Duncan 1 Crum, NE NE NE 14-1n-13w, dry at 2,633 ft., Biehl 1,675 ft., Clore 1,756 ft., Golconda 2,124 ft., Barlow 2,203 ft., Cypress 2,240 ft., Paint Creek 2,353 ft., Benoist sand 2,380 ft.

R. S. Young 1 C. Jordan, SW SW NW 31-2n-11w, dry at 1,980 ft., Glen Dean 1,657 ft., Golconda 1,710 ft., Benoist 1,976 ft.

White County: N. V. Duncan 1 Metcalf, SW SW SE 31-3s-14w, pumped 40 bbl., natural, Benoist sand 2,817 ft., T.D. 2,828 ft., pool opener.

Superior 2 C. Speck, NW SW SW 31-4s-14w, dry at 3,080 ft., base Pennsylvanian 2,123 ft., Cypress sand 2,640 ft., Benoist sand 2,767 ft., Renault 2,820 ft., Aux Vases sand 2,895 ft., Ste. Genevieve 2,913 ft., McClosky 3,027 ft.

Williamson County: Superior 1 Rogers-Harris, NE SW NW 24-8s-3e, dry at 2,895 ft., Kincaid 1,392 ft., Tar Springs sand 1,983 ft., Glen Dean 2,013 ft., Hardinsburg sand 2,118 ft., Cypress sand 2,309 ft., Aux Vases sand 2,579 ft., Ste. Genevieve 2,641 ft., McClosky 2,767 ft., T.D. 2,895 ft.

Fields

Bible Grove, Clay County: Kingwood 1 Hall, NW SE NE 17-5n-7e, pumped 504 bbl. oil and 33 bbl. water, shot 2,520-28 ft., Weiler 2,513-20 ft., 2,523-35 ft., T.D. 2,945 ft., P.B. 2,929 ft.

Dale, Hamilton County: Texas 3 Clark, SE SW NW 8-6s-7e, dry at 3,185 ft., Glen Dean 2,415 ft., Weiler 2,969 ft., Paint Creek 2,830 ft., Benoist sand 2,884 ft., Aux Vases sand 3,000 ft., Ste. Genevieve 3,041 ft., Levias 3,068 ft., McClosky 3,100 ft.

Shell 6 A. E. Richardson, SE SE NE 7-6s-7e, pumped 7 bbl., shot 2,996-3,017 ft., Aux Vases sand 2,972-3,017 ft., T.D. 3,022 ft.

Carter and Texas 2 P. Short, SE NW SE 12-6s-6e, pumped 68 bbl., shot 3,046-81 ft., Aux Vases sand 3,036-55 ft., T.D. 3,081 ft.

East Inman, Gallatin County: Skelly 2 Hoge, NW NW SE 15-8s-9e, dry at 2,985 ft., Palestine 1,950 ft., Waltersburg sand 2,109 ft., Vienna 2,153 ft., Tar Springs sand 2,212 ft., Glen Dean 2,238 ft., Hardinsburg sand 2,310 ft., Barlow 2,480 ft., Cypress sand 2,489 ft., Benoist sand 2,619 ft., Aux Vases sand 2,788 ft., Ste. Genevieve 2,821 ft., McClosky 2,881 ft.

Friendsville, Wabash County: Sinclair-Wyoming 2 Majors, SW SW SW 2-1s-13w, swabbed 45 bbl., natural, Cypress sand 2,320-29 ft., T.D. 2,333 ft.

Iola, Clay County: Texas 1 M. Birch, SE SE NE 16-5n-5e, pumped 50 bbl. oil and 2 bbl. water, natural, Aux Vases sand 2,354-67 ft., T.D. 2,367 ft.

F. A. Budge 1 Landreth, NW NW SW 16-5n-5e, pumped 35 bbl. oil and 60 bbl. water, shot 2,380-90 ft., Aux Vases sand 2,362-64 ft., T.D. 2,390 ft.

Tide Water 2 Davis, NE SW NE 15-5n-5e, pumped 150 bbl., natural, Cypress sand 2,144-50 ft., T.D. 2,368 ft.

Texas 8 A. Kidwell, NW NE NW 15-5n-5e, pumped 50 bbl. oil and 2 bbl. water, Aux Vases sand 2,338-46 ft., 2,361-69 ft., T.D. 2,369 ft., P.B. 2,363 ft.

Texas 5 A. Kidwell, NE SE NW 15-5n-5e, pumped 385 bbl., acidized, McClosky 2,427-35 ft., T.D. 2,437 ft.

Texas 4 A. Kidwell, SE SE NW 15-5n-5e, pumped 250 bbl. oil and 3 bbl. water, shot 2,261-2,316 ft., Aux Vases 2,293-2,318 ft., T.D. 2,318 ft.

King, Jefferson County: Texas 2 Baker, NE SE NE 33-3s-3e, pumped 11 bbl. oil and 11 bbl. water, shot 2,747-61 ft., Aux Vases sand 2,738-55 ft., T.D. 2,780 ft.

Mount Carmel, Wabash County: Shell 2 Parkinson, SW SW SW 17-1s-12w, pumped 23 bbl. oil and 7 bbl. water, shot 2,035-39 ft., Weiler 2,025-37 ft., T.D. 2,039 ft.

Noble, Richland County: Pure 1 C. Woodward, NW SW NE 25-4n-9e, pumped 14 bbl., natural, Weiler 2,548 ft., Pay 2,550-65 ft., T.D. 2,568 ft.

Phillipstown, White County: Jarvis & Marcell 4 A. Cleveland, SE SE SE 36-4s-10e, pumped 55 bbl., natural, Tar Springs sand 2,274 ft., saturation 2,318-27 ft., T.D. 2,327 ft.

Rural Hill, Hamilton County: Texas 1 W. Dial, NW NW NE 18-6s-6e, pumped 126 bbl. in 18 hr., shot 3,114-24 ft., Aux Vases sand 3,109 ft., T.D. 3,214 ft.

West Johnsonville, Wayne County: Gulf Ref. 1 Linda Vest, NW SE 18-1n-5e, dry at 2,948 ft., Glen Dean 2,336 ft., Barlow 2,515 ft., Cypress 2,576 ft., Benoist 2,726 ft., Aux Vases 2,771 ft., Ste. Genevieve 2,832 ft., McClosky 2,924 ft.

Woodlawn, Jefferson County: Cameron Bros. 2 Shultz, NW SW NW 35-2s-1e, pumped 150 bbl. oil and 2 bbl. water, shot 1,988-2,004 ft., Benoist sand 1,982 ft., saturation 1,993-2,001 ft., T.D. 2,004 ft.

W. Duncan 1 A. Howe, NE NW SW 25-2s-1e, pumped 96 bbl. oil and 44 bbl. water, natural, Benoist sand 2,002-07 ft., T.D. 2,010 ft., P.B. 2,006 ft.

California

(Continued from Page 110)

Riverdale, Fresno County: Amerada Petroleum Corp. 56-15 Brum, 15-17s-19e, flowed 455 bbl., 33°, 4 per cent cut, 349,000 cu. ft. gas, flow pressure 800 lb., T.D. 6,900 ft., perf. 6,800-20 ft., completed in Lawton zone of Miocene age.

Round Mountain, Kern County: Shell 23 Freeman, 20-28s-29e, pumped 17 bbl. net, 24°, 25 per cent cut, T.D. 1,800 ft., perf. 1,393-95 ft., completed in Vedder zone of Miocene age.

Condensate Well Makes Good Oil Flow on Reopening

W. R. Gerard 1 Acquistapace in the Santa Maria Valley field was opened up and began flowing at a daily rate of 1,500 bbl. of 18.5-gravity oil and 15,000,000 cu. ft. gas. This well, which was drilled on property quitclaimed some time ago by Union Oil Co., was originally finished several weeks ago as a gas well at which time it only produced a fine spray of condensate. After being shut in since completion, the operator opened up the well this week and found a large flowing well. The well's gas production is by far the largest recorded in several years. The Santa Maria Valley field has one peculiarity that is outstanding and that is the great disparity between wells in the same area. Gerard may

have possibly taken more penetration into the Franciscan basement as there has been a rumor that operators have been stopping drilling too soon. There is no possibility, of course, of developing commercial production in the true Franciscan but in several wells the uppermost part of the Franciscan has been broken and crushed to such an extent that it is capable of retaining oil and gas as in the conglomerate in the Playa Del Rey field in Los Angeles Basin.

Del Valle

R. E. Havenstrite has completed his 2 Barnes a deep test in the Del Valle field of Los Angeles County and current production has been averaging 35 bbl. per hour. This well which was drilled to 9,870 ft. where an unproductive zone was found is at present flowing from perforated intervals at 7,900-75 ft. and 7,990-8,065 ft. and should make a splendid well when finally listed as a completed project. This is a new productive horizon for the Del Valle field.

Rincon Outpost

Shell Oil Co., Inc., has made location for a semiwildcat on the north flank of the Rincon field of Ventura County in 8-3n-24w, and early work is anticipated. The Rincon field is located at the extreme western end of the major Ventura Avenue anticline which sweeps westward from the Ventura Avenue field to Rincon where it plunges beneath the Pacific Ocean. The location of this well places it north of the Rincon fault and the prospect is for deep drilling as the displacement is upward south of the fault.

COASTAL DISTRICT COMPLETIONS

Del Valle, Los Angeles County: R. E. Havenstrite 2 Barnes, 16-4n-17w, flowed 900 bbl., 42°, 1 per cent cut, 750,000 cu. ft. gas, 12/64-in. bean, pressures 875/1,850 lb., T.D. 9,870 ft., P.B. 8,400 ft., perf. 7,900-75 ft., 7,990-8,065 ft., completed in a new Miocene zone that will probably be designated as the Bering zone, this new horizon is the deepest producing sand in the field at the present time.

Buena Park and La Mirada Tests Report Progress

Texas Co. is making good progress with two important wells in Los Angeles Basin and both may determine future prospects. In the Buena Park field of Orange County, the company is making hole in 5-J-1 Buena Park at 6,600 ft. and should pick up the anticipated pay within another 1,000 ft. This is the fifth well to be drilled at Buena Park by Texas and it may determine the future status of the area. Out of four holes drilled to date, Texas has two small producers and two dry holes and strange as it may seem the highest well structurally was one of the dusters and the lowest well structurally proved to be the most productive. The structure at Buena Park is a plunging nose with the plunge toward the valley and away from the hilly area. In the La Mirada district to the northwest, Texas is making hole in 3-A McNally at 6,450 ft. but is still some distance from the top of the Miocene which is the well's objective. Two other wildcats at La Mirada have been drilled and abandoned by Texas and only minor showings were logged.

LOS ANGELES BASIN COMPLETIONS

Coyote, West, Orange County: Standard 131 Murphy Coyote, 17-3s-10w, flowed 549 bbl., 30.9°, 1 per cent cut, 1,066,000 cu. ft. gas, 32/64-in. bean, flow pressure 820 lb., T.D. 5,975 ft., perf. 5,573-5,973 ft., completed in 99 zone of Pliocene age.

Huntington Beach, Orange County: Standard 40-A Huntington Beach, 3-6s-11w, pumped 56 bbl., 16.9°, 7 per cent cut, T.D. 3,600 ft., perf. 3,288-3,598 ft., completed in Barley Flats zone of Pliocene age.

Yorba Linda, Orange County: Shell 88-16 Olinda fee 4, 16-3s-9w, pumped 195 bbl., 18.5°, 2 per cent cut, T.D. 1,953 ft., perf. 1,678-1,812 ft., 1,866-1,948 ft., upper oil sand 1,673 ft., lower oil sand 1,863 ft., completed in lower or third oil zone of Miocene age.

NORTH LOUISIANA

New Wildcats Started Spur Drilling Operations

SHREVEPORT, La.—First reports of new wells in North Louisiana and Arkansas indicated an upturn in drilling after a lull of several weeks. In North Louisiana three wildcats were getting under way. Five miles west of the Spider area in De Soto Parish, Crosby Drilling Co. 1 Anders, SW NE 5-11n-14w, was rigging up for a Travis Peak test. In Red River Parish, Peterson Petroleum Co. made location for a 5,400-ft. test in SE SE of 11-12n-10w. The third wildcat was Bering Oil Co.'s 1 E. Moresi, SW NE SE 10-22n-14w, 3 miles west of Hillsboro, which had made a location.

Two wildcat first reports in Arkansas were W. S. King 1 E. A. Stubblefield, NE NE 10-12s-30w, located about 3 miles southwest of the town of Wilton in Little River County. East of the Rainbow City pool in Union County, Sam Richardson et al staked location for 1 J. C. Moody, SW NW 16-17s-14w.

Hunt Oil Co. obtained a permit to drill its 1 Brownlee in NW NW NW 10-23n-12w. It is the fifth operation for the North Carterville pool of northern Bossier Parish. Two wells have been completed in the field and Hunt was reported to be ready to complete at its 1 Oglee.

ARKANSAS COMPLETIONS

Wildcat, Nevada County: Barney Dunlap 1 E. Hart, SE SW 17-13s-21w, dry, T.D. 2,138 ft., Midway 535 ft., Nacatoches 935 ft., bailed fresh water.

Dorcheat, Columbia County: Magnolia 1 Nipper-Jourdan, C S½ SE 14-18s-22w, flowed 10 bbl. distillate, Smackover 8,918-22 ft., 8,936-39 ft., T.D. 8,941 ft.

Root Pet. 1 Farmers Bank & Trust, C SW 14-18s-22w, flowed 126 bbl. 68-gravity, perf. 7,083-93 ft., 7,099-7,113 ft., T.D. 8,944 ft.

Fouke, Miller County: Carter Oil 12 W. P. Sturgis, SE NW NE 1-17s-27w, pumped 161 bbl., perf. 3,645-62 ft., T.D. 3,860 ft.

Nick Springs, Union County: Fohs Oil Co. 1 C. T. Grace, approx. NW SE 31-17s-14w, flowed 7 bbl. an hr., 50 per cent salt water, perf. 4,790-93 ft. in Cotton Valley, T.D. 6,710 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Bossier Parish: British American 1 K. H. Blocker, NE NW SW 1-22n-13w, dry, T.D. 6,519 ft., Nacatoch 1,860 ft., Saratoga 2,318 ft., Tokio sand 3,055 ft.

Claiborne Parish: F. R. Sylvestre 1 S. P. Meadows, NE SE 23-22n-7w, dry, T.D. 6,012 ft., Nacatoch 2,230 ft., Saratoga 2,440 ft., Massive anhydrite 4,460 ft., Pettit 5,820 ft.

Wildcat, Red River Parish: Cryer & Reese 1 Long-Bell Lumber, NE NW 23-12n-9w, dry, T.D. 2,505 ft., Nacatoch 1,270 ft., Saratoga 1,418 ft.

Cypress Bayou, La Salle Parish: Carter Oil et al 1 Highland Farms, SW SW 12-6n-4e, dry, T.D. 5,015 ft., Cockfield 1,532 ft., Cooks Mt. 2,105 ft., Sparta 2,248 ft., Cane River 2,985 ft., Wilcox 3,107 ft.

Haynesville, Claiborne Parish: Midstates Oil 1 V. E. Lowe, C E½ SE 5-23n-8w, flowed 334 bbl. in 7 hr., ½-in. choke, Pettit 5,446-55 ft., 5,500-8 ft., T.D. 5,513 ft.

Logansport, De Soto Parish: J. E. David 1 Ward, SE SE SE 2-11n-16w, dry, T.D. 2,960 ft., show oil 2,580 ft., acidized and tested 15 bbl. and died.

Manifest, Catahoula Parish: Jordan Pet. 1 J. A. Lanier, 43-9n-5e, dry, T.D. 1,722 ft., Sparta 1,698 ft.

MISSISSIPPI

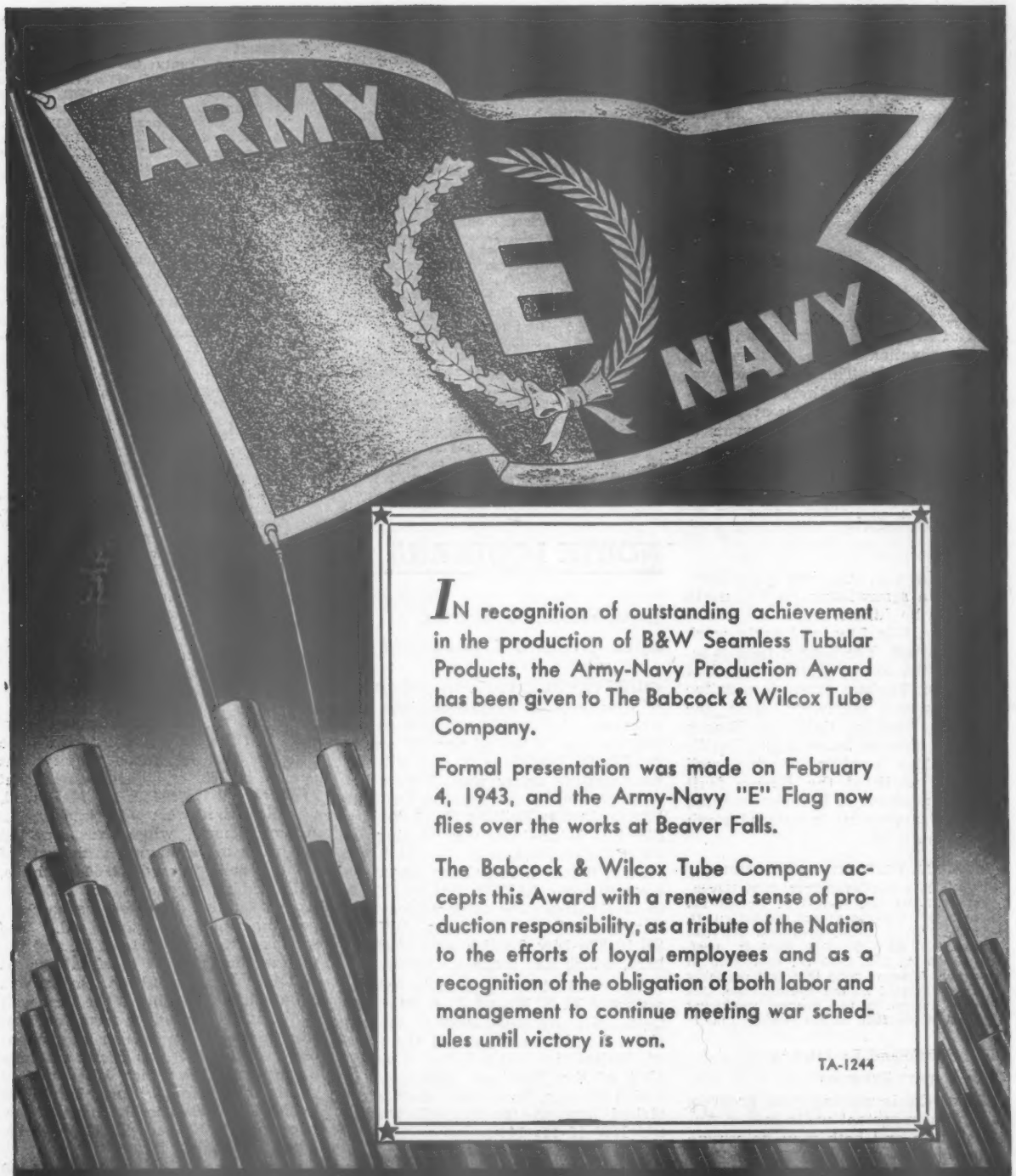
JACKSON, Miss.—The most important oil strike in Mississippi since the Tinsley field in Yazoo County was opened in 1939 is believed to be that of Pure Oil Co.'s 1 J. M. McDowell, 6 miles southwest of Natchez, in Adams County, which was reported last week to be flowing at the rate of 100 bbl. daily through 10/64-in. choke, with tubing pressure of 1,800 lb. About 16 bbl. of water was accompanying the 47.8-gravity oil. The well is bottomed at 11,102 ft., and the production is from perforations at 10,281-85 ft. The 5½-in. casing was set at 11,100 ft. This is the first well in the state to produce from the Tuscaloosa formation, which it encountered at 10,270 ft. It is not unlikely that other holes, which failed to find pay in the Wilcox, will now be drilled to the Tuscaloosa in the hope of duplicating Pure's success. New drilling also is looked for.

Pure controls a block of about 4,500 acres in the Natchez district. Several hundred feet from the discovery well is a lease of 650 acres held by Humble Oil & Refining Co., which presumably will drill an offset.

The California Co. 1 G. T. Smith, 4-7n-7e, Lincoln County, which flowed 11 bbl. of oil through open tubing, was coring at 11,350 ft. in an unreported formation after perforations at 10,138-56 ft. had been squeezed off.

MISSISSIPPI COMPLETION

Sharkey County: The Texas Co. 1 Linzey, SE NW 19-13n-5e, dry, T. D. 5,051 ft.



IN recognition of outstanding achievement in the production of B&W Seamless Tubular Products, the Army-Navy Production Award has been given to The Babcock & Wilcox Tube Company.

Formal presentation was made on February 4, 1943, and the Army-Navy "E" Flag now flies over the works at Beaver Falls.

The Babcock & Wilcox Tube Company accepts this Award with a renewed sense of production responsibility, as a tribute of the Nation to the efforts of loyal employees and as a recognition of the obligation of both labor and management to continue meeting war schedules until victory is won.

TA-1244

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BOILER TUBES · CONDENSER TUBES · HEAT EXCHANGER TUBES
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THE BABCOCK & WILCOX TUBE CO., BEAVER FALLS, PA.

PERSONALS

W. V. VIETTI

Vietti Returns From Colombia to Become Chief Engineer

W. V. VIETTI, who has returned to the United States after 5 years in Colombia, is now chief petroleum engineer in the producing department of Texas Co., Houston, Tex.

He entered the service of Texas Co. in 1929 as petroleum engineer in Texas and New Mexico. In 1933 he was transferred to the South Texas division as senior petroleum engineer, to the duties of which post those of production superintendent were added later. In 1938 he was sent to Bogota, Colombia, as manager of Texas Petroleum Co. Two years later he was made vice president and manager of Colombia Petroleum Co. and South American Gulf Co., affiliates of Texas Co. and Socony-Vacuum Oil Co., Inc. He was holding these positions at the time of his recall to this country.

Born in Congress, Ariz., Mr. Vietti graduated from high school in National City, Calif., then entering University of California, from which he received his B.S., M.S., and Ph.D. degrees. He went to work in the production research department of Marland Oil Co. and was advanced successively to petroleum engineer in the Texas Panhandle, assistant chief petroleum engineer in Texas, and in 1928 was sent to Big Spring, Tex., as petroleum engineer in charge of Texas and New Mexico operations for Continental Oil Co., with which Marland had been merged.

Mr. Vietti married Grace Christian, of Orland, Calif., and they have three children.

William Carl Clemons, appointed superintendent of production for the Gulf Oil Corp. in the Houston, Tex., production district to succeed the late J. H. Tucker, entered Gulf's service as a driller's helper in the Spindletop field in 1904. He was employed in various field capacities until his appointment as assistant superintendent of production in 1913. In his new position he has supervision of coastal Louisiana, East Texas, coastal Texas, and Southwest Texas. Mr. Clemons was born in Shop Springs, Tenn., in 1882.

Russell Belfield has been transferred from the land and geological department to the producing department of Sun Oil Co.'s Michigan division, and has been assigned to the Evart field.

Richard H. Knox, Taylor Cole, and **Ish McKnight** are three new members of the Midland, Tex., office of Lario Oil & Gas Co. Mr. Knox was landman for Skelly Oil Co. for 7 years and prior to that was with Shasta Oil Co. and Atlantic Refining Co. Mr. Cole resigned from University Lands to enter the employ of Lario, and Mr. McKnight was with Mid-Continent Petroleum Corp. at Midland for 7 years, and at Tulsa for the same company for 3 years.

Lt. Col. John C. Morgan, of Houston, Tex., to leave no doubt in anybody's mind that he is somewhere in Australia, sent Mrs. Morgan a kangaroo rug, which arrived a few days ago. Colonel Morgan was a chemical engineer in technical department of Sinclair Refining Co. when he was called into service as a member of the Officers Reserve Corps in May 1941. He was commissioned a captain, assigned to the chemical warfare service and in December of that year was sent to Australia. He is a member of the American Chemical Society.

Charles R. Yeoman, Houston, Tex., formerly in the Illinois Pipe Line Co.'s engineering department in the Gulf Coast district, has been transferred to Casper, Wyo., where he is assigned to the Ohio Oil Co., engineering department, pipe-line division.

H. T. Morian, who went to Bradford, Pa., in the early stages of the oil excitement in 1878, observed his ninety-fourth birthday during February. Mr. Morian retired 9 years ago after spending 73 consecutive years in the oil industry.

Z. A. Dyer has been appointed manager of lands and production of Sunset Oil Co. succeeding **George H. McCarthy,** who recently resigned to accept a position as general manager of Franco Public Service Co., a producing and marketing organization with headquarters at Vermilion, Alta.

Ennis B. McElveen, superintendent for Lusk Oil Co. in the Lochridge field, Brazoria County, Texas, is in St. Joseph Hospital, Houston, recovering from third-degree burns suffered while burning a stump near an oil tank. He suffered burns on his head, face, back and chest.

Lt. Reed R. Daniels, formerly chainman in the land department for Shell Oil Co., Inc., Houston, Tex., was among officers selected to take the course in liaison piloting with a glider training detachment at Denton, Tex. After becoming a pilot Lieutenant Daniels will return to Fort Sill, Okla., where he previously had been stationed, for a course in aerial observation.

J. S. Hughes, formerly landman for Magnolia Petroleum Co. in Great Bend, Kans., has been transferred to Houston, Tex., where his district comprises eight Gulf Coast counties southwest of Houston. He succeeds **Haymond Willis,** who resigned.

W. J. McIntyre, division manager of Arkansas Louisiana Gas Co., Shreveport, La., has been elected president of the United Community organization of Shreveport, for 1943. He has been vice president during the past year.

Ross McCollum, president of National Oil Co. was recently elected a member of the board of directors of the Los Angeles Better Business Bureau.

Benjamin F. Harris, of Pittsburgh, Pa., has resigned as president of Oil Well Supply Co., National Tube Co.

and Tubular Alloy Steel Corp., subsidiaries of U. S. Steel Corp., but will remain with the parent company as consultant to **B. F. Fairless**, president, in connection with war activities. Mr. Harris has been connected with companies now forming a part of U. S. Steel for more than 30 years.

George D. Gavin, assistant to the general sales manager of Tide Water Associated Oil Co., San Francisco, Calif., was recently elected a director of the San Francisco Advertising Club.

A. E. Durham, independent oil operator; **Herbert Dennett**, district sales manager for Humble Oil & Refining Co., and **Arthur L. Elliott**, auditor for Southern Minerals Corp., were elected vestrymen of the Episcopal Church of the Good Shepherd, Corpus Christi, Tex., at its annual meeting last week.

William C. McDuffie, president of Wilmington Gasoline Co., has been elected a member of the board of directors of Northrop Aircraft, Inc.

D. S. Scott, assistant to the vice president, Gulf Oil Corp.; **Glenn Byers**, head of production personnel department, Shell Oil Co., Inc.; **C. M. Reed**, division manager marketing department, Continental Oil Co.; **N. H. Underwood**, secretary to the vice president, Sinclair Refining Co.; **George D. Wilson**, public relations director, Houston Oil Co.; **J. B. Arthur**, building manager, Humble Oil & Refining Co., and **A. Allessandra**, building manager, Texas Co., have been named to head major oil company committees in the victory book campaign being conducted in Houston, Tex.

Dr. Robert Stirton of Union Oil Co.'s Los Angeles refinery is conducting an advanced war-training course in chemical engineering as applied to refining · petroleum products at the University of California at Los Angeles.

Mayor J. K. Montgomery, of Three Rivers, Tex., oil man, spoke before the Rotary Club of that town last week on "Discovery and Production of Oil."

J. L. Mathieu, Schlumberger Well Surveying Co., Houston, Tex., addressed the Fort Worth Geological Society at the regular weekly meeting Monday, February 15, on the "Use of Self-Potential Dipmeter."

Robert Tennant, Skelly Oil Co., has been transferred to the West Texas division offices at Midland, Tex. **Clark Steinberger**, recently of Beaumont, where he was employed as geologist by the Ohio Oil Co., has joined the Skelly company at Midland.

Vernie Lunday Burress of McCamey, Tex., and **Lloyd LaFon** of Wichita Falls, Tex., employes of Shell Pipe Line Corp., will be presented the president's medal and an assisting certificate by **H. H. Anderson**, vice president of Shell Pipe Line Corp., for their respective parts in saving the life of **H. W. Peterman** following a pipe-line accident last September. The presentation will take place at a meeting of the Employes Archer-Baylor Safety Chapter in Wichita Falls.

R. M. Zimmerly, formerly petroleum engineer for Humble Oil & Refining Co. at Midland, Tex., has been commissioned second lieutenant in the U. S. Marine Corps.

R. E. Hardwicke, Fort Worth, Tex., has been appointed special consultant to PAW. He will retain his general practice.

William K. Whiteford, vice president of the British-American Oil Co., Toronto, Canada, is visiting company properties in the Mid-Continent.

J. W. Cumming, Sunburst, Mont., has been made superintendent of Ohio Oil Co., producing operations in the Grass Creek, Elk Basin and Byron-Garland districts with head-

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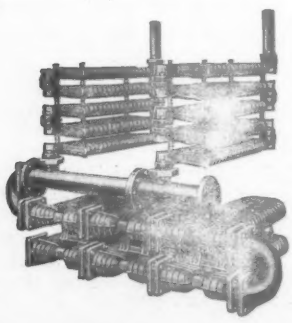

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GENERAL OFFICES AND PLANT—BUFFALO, N. Y.

quarters at Basin, Wyo. **W. C. Athon,** formerly superintendent at Basin, has returned to Cody, Wyo., where he will devote full time to Oregon Basin district operations.

Emile E. Soubry, who for a number of years has been in charge of Jersey's operations in the United Kingdom, has been appointed coordinator of foreign marketing for the Standard Oil Co. (N. J.). Until this appointment, Mr. Soubry had been with Anglo-American since 1911. In 1931 he was made general manager of the latter company, Jersey marketing subsidiary in the United Kingdom, and in 1933, he was elected a director.

P. J. Timms, active in Alberta oil development since 1910, has been named managing director of Highwood-Sarcee Oils of Calgary, and associate companies. He succeeds **R. G. Straker,** who remains as director but will devote specific attention to management of the Valley Gas Co., in Turner Valley.

Joe A. Laird, district engineer for the Texas Railroad Commission in Houston, has resigned to accept a position as petroleum engineer with **George W. Strake,** Houston independent operator. Mr. Laird, a graduate of Texas A. & M. College, was formerly associated with **Jo H. Cable,** Wichita Falls, Tex., consulting engineer. He assumed his new duties February 22 at Strake's Conroe office.

C. C. Brunk, of the Union Oil Co. of California, has been elected a director of the Foreign Trade Association of Southern California for 1943.

George C. Caine of Bayonne, N. J., has been promoted to general superintendent of Tide Water Associated Oil Co.'s refinery at that eastern city. Previously, he was assistant general superintendent. He joined Tide Water in 1926 in the research and development department.

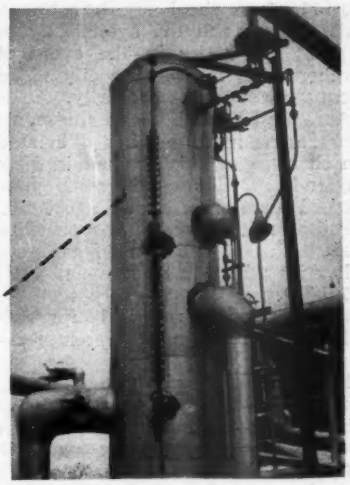
Lt. Ralph J. McBride, Jr., formerly in the geophysical department of the Texas Co., Houston, Tex., and now a pilot in the Air Force, is believed to have been aboard one of the Liberators that participated in the big daylight attack on northern France, when a record number of German planes were shot down. Lieutenant McBride resigned his position with Texas Co. in July 1941 to enter military service.

Maj. Kenneth R. March, former Fort Worth, Tex., oil operator and wildcatter, has been assigned to Robbins Field at Warner Point, Ga. Major March attended the U. S. Military Academy at West Point, and served with the Canadian Air Force during World War I on patrol along the English Channel. He was with the land department of the Pure Oil Co. in West Texas in 1926, and since that time has been an independent operator. He reentered military service in March 1942.

E. G. Dahlgren, technical secretary of the research and coordinating committee of the Interstate Oil Compact Commission, left Oklahoma City, Okla., Monday night for Denver, Colo., and Casper, Wyo., for conferences with state oil and gas commissions. He will return to Wichita, Kans., for the compact's executive committee meeting Saturday.

Jack H. Abernathy, engineer with the Oklahoma City Pool Wilcox Engineering Association, was principal speaker at the monthly meeting of the Central Oklahoma production chapter of the American Petroleum Institute at Oklahoma City, Tuesday night.

The Eye Line is the Check Line



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Market Developments

East Coast

NEW YORK.—Further small but significant improvement in the East Coast supply situation has become apparent, though localized shortages continue. The latter were in evidence in New York city where a temporary critical shortage of kerosene was corrected by borrowing 64,000 bbls. from the Navy department. This amount and the availability of a greater quantity in the event of another crisis insured the city of an adequate supply temporarily.

Acceleration of box-car shipments of kerosene in drums has alleviated the shortage of this product in New England. Deliveries by this new method have risen above 18,000 bbl. per day, almost double the previous peak. This supplement to tank-car deliveries which have exceeded 150,000 bbl. per day recently has apparently given this critical area sufficient supplies to meet presently rationed demands.

Evidence of the improved situation in the East Coast area was contained in the American Petroleum Institute's weekly index of available supplies which rose 0.9 to 36.5, the second consecutive week in which it has improved after a steady 10-week decline. Further improvement is expected as the effects of the completion of the 24-in. line to Illinois and the Bayou project are felt. First shipments from the Illinois terminal were made last week.

Mid-Continent

CALLS for kerosene and tractor distillates this week became more active in the Mid-Continent refinery market as rural jobbers and dealers throughout the Middle West agricultural belt prepared for record consumption this spring, summer and fall.

Other products were in steady demand. Some calls for motor fuel and distillate oils included urgent shipping instructions, indicating that consumption responded somewhat along normal trends to more favorable weather. Much of the current essential driving is for longer trips and more consistent car operation than prevailed before Pearl Harbor which is one of the reasons why motor-fuel consumption has not declined to the full extent indicated by severity of the rationing program on ordinary driving.

All product prices are steady at unchanged levels. Refiners point out that existing ceilings on all products virtually precludes normal seasonal fluctuation prices.

Mid-Continent refiners are swinging more abruptly to instructions from the Petroleum Administration for War to reduce gasoline output to not more than 70 per cent of the rate manufactured during the last half of 1941. Some plants are reluctant to accept the order literally pending final decision on which leg of the 20-in. products line will be built first.

Gulf Coast

HOUSTON, Tex.—A generally firm market prevailed in the Gulf Coast territory this week, though signs of a little easiness in gasoline were reported. Some refiners, most of them classified as small operators, were concerned over their swelling inventories, but these same refiners were unwilling to enter into contracts for long-time shipments. They believe higher prices for crude are probable, and they would rather grapple with the problem of overlarge stocks than take a chance on having to deliver gasoline later made from crude bought at prices that might extinguish profits. Furthermore, they incline to the opinion that present unfavorable conditions, mainly caused by transportation difficulties, are temporary. Reports of undesirably large stocks of gasoline were not confined altogether to small refiners. Some major companies would like to dispose of accumulations more rapidly.

Kerosene probably was the tightest product in the list, with heating oils and burner oils close behind. When the order forbidding tank-car deliveries of gasoline to the East Coast was issued last month small and semi-major refiners who had tank cars in service began using the cars for kerosene, which was in particularly lively demand. After disposing of their own stocks some of them bought kerosene from other refiners in order to retain the tank cars in service. The result has been a general depletion of kerosene stocks, so that now this commodity is almost impossible to get, even if premium prices are offered. The same condition exists, but in a somewhat less acute degree, in the heating and burning oils. No. 2 heating oil is extremely hard to find.

Pacific Coast

LOS ANGELES, Calif. — California refined oil markets this week are relatively quiet but the foundation has been laid whereby independent refiners may increase their prices to the ceiling as posted by Standard Oil Co. of California. For the past several months there has been enough distress selling to prevent any general strengthening of the market. The way is open to increase prices to the existing ceiling but as yet no one has taken advantage of the situation. Very little trading has taken place during the past several weeks primarily because of prevailing low prices for gasoline and inability to move motor fuels in quantity.

Fuel-oil prices and demand continue at high rates and there is nothing to indicate any weakening in prices. Some sales of gas oil were made during the week and the limited quantity that moved was at ceiling prices.

Refiners, anticipating the probable increase of heavy crude-oil prices and a relative advance in fuel-oil ceilings are not especially anxious to dispose of stocks. Operators are attempting to evaluate the effect of higher crude prices on refined oil markets.

There has been restraint in crude-oil purchases by some independent refiners. Kern Oil Co., which has been disposing of its crude oil to one small refiner, is now storing production at its idle refinery near Pico, Calif. Most of this oil comes from the Montebello field and would be affected favorably by any increase in posted price. It is produced in accordance with existing conservation program and is therefore eligible for sale at any time the company desires.

A.P.I. REFINERY REPORT

Week Ended February 13, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	148	3,016	586	886
Ind., Ill., Ky.	731	19,109	2,689	4,182
Okla., Kan., Mo.	351	7,520	1,385	1,386
Censored area*	1,562	40,254	10,629	16,094
Rockies	89	1,943	516	372
California	730	20,267	54,859	11,572
Total 2-13-43	3,605	92,109	70,866	34,292
Total 2-6-43	3,692	90,253	71,095	35,503
Total 2-14-42	3,764	104,554	88,759	37,465

Note: Refinery runs and stocks for week ended February 20, 1943, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
February 13, 1943	234,239,000
February 6, 1943	232,623,000
February 14, 1942	254,463,000

*Excludes unrefinable in California.

Refinery Prices

(Prices as of February 23)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*			5.875-6.000		5.500-5.625
Pennsylvania		6.750-7.000			
Gulf Coast‡	6.00-6.50		§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80		9.2	9.2	
California		6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.500	4.375	
North Louisiana				4.500-4.750	
Pennsylvania	6.250-6.625	6.125-6.250			
California				4.500-5.500	4.250
Northeast Coast				6.80	
Gulf Coast				3.875	

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	34 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125					
California		2.750-4.000			‡$1.35-1.45	$0.85-0.90
Gulf Coast			4.000	4.125	1.45	0.85
Northeast Coast				6.800	2.780	1.65
North Louisiana						†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	$.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	3.875-6.000	†5.250-5.500	
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-4.0		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-35
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
360-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-35 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.20
Boston, Mass.	14.90	4.50	9.80
Burlington, Vt.	16.90	5.50	10.10
Buffalo, N. Y.	16.20	5.50	10.80
Dover, Del.	16.70	5.50	12.00
Hartford, Conn.	15.60	4.50	9.70
Manchester, N. H.	17.30	5.50	10.80
Newark, N. J.	15.20	4.50	9.70
New York, N. Y.	16.10	5.50	9.80
Philadelphia, Pa.	16.20	5.50	11.45
Pittsburgh, Pa.	16.70	6.50	12.00
Portland, Me.	16.30	5.50	9.90
Providence, R. I.	15.60	4.50	9.60
Washington, D. C.	15.20	4.50	11.00
Average 14 cities	16.02	5.14	10.49

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co., and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.60
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.80
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.98	7.50	
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	‡9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.00
Average 11 cities	18.34	7.50	10.46

*Includes 1-cent state tax.
‡Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	13.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.80
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.55	5.96	10.76

Rocky Mountain Area

(Continued from Page 118)

geles, have acquired two blocks to the north and south of the Reeder well which now are being unitized and which will be explored for both oil and potash.

The lease play in the Big Horn basin springs from the discovery of oil in the Pennsylvanian formation a few months ago in a well drilled by the Minnelusa Oil Corp. at the south end of the Elk Basin field. The well made 80 bbl. an hour with the valve partially closed. The acreage in the field proper is closely held and no trading has been reported, but out from the mapped structure leasing is taking place for a distance of 50 miles, both on the Wyoming and Montana sides. As high as $50 an acre has been reported for leases along the trend of the anticline. This is classed as a major black-oil discovery and indications point to it being one of the largest fields in the basin since the well is far from the top of the structure. Minnelusa is spudding in its 2 Henderson, NE NW NE 31-58n-99w, 1,320 ft. west of the discovery. Ohio Oil Co. 4 Mack, OPC-4, SE SW SE 30-38-99, ⅓ mile northwest of the discovery, is about on top of the objective Tensleep at 4,363 ft. Julius C. Peters Jr. 1 Government, C NW NW 25-9s-22e, Clark's Fork dome, Montana side north of Elk Basin, is coring at 2,550 ft. for samples to identify the horizon.

The Denver basin play springs from the General Petroleum discovery on Horse Creek, Southeast Wyoming, on the northwest rim of the basin. A second well, 77-6-P Whitaker, ½ mile south of the discovery, is bottomed in the red beds at 6,111 ft., with water showing in the basal Sundance. It will plug back to the Muddy sand where it probably has a producer. The well runs low and the plans are to drill another test on the north side. This discovery has brought back land men and geophysical crews of companies which pulled out of eastern Colorado when the Illinois fields took the limelight several years ago. Illinois operators now are reported interested in the area. Some large producers in Pennsylvania now have representatives in the area looking for prospects. They are active on the grounds that war requirements in that state have deprived them of so much oil field goods that drilling cannot be prosecuted efficiently and indications that restrictions are not going to be so severe out here in view of the necessity for discovering more reserves.

Oklahoma Fields

(Continued from Page 125)

In northern Seminole County and about 2 miles north of Cromwell production, Continental and Kerlyn 1 Scott, NW SW SW 3-10n-7e, near Sylvia, was shut in after flowing 140 bbl. of oil in 13½ hours in Hunton lime at 4,178-4,200 ft. Total depth was 4,510 ft., plugged back to 4,210 ft. Gas was gaged at a little over 4,000,000 cu. ft.

The Northeast Edmond pool in Oklahoma County was extended ¼ mile north by Harper-Turner at their 1 Keil in SE SW 8-14n-2w. The well flowed 38 bbl. through ⅛-in. choke in sand at 5,860-90 ft. Location was being made for the same company's 1 Brown, SE SE 7-14n-2w, ½ mile west of the 1 Keil.

Deep Test Resumes Drilling

In the Binger pool of Caddo County, Denver Producing & Refining Co. 1 Sah-Can, SE SE 33-10n-10w, was reported drilling by stuck drill pipe at 9,200 ft. The well reached 13,842 ft. before being shut down by mechanical trouble. Drill pipe then stuck at 12,000 ft. and after an unsuccessful fishing job, the hole was plugged back to 9,000 ft. to bypass the fish. The test was started in February 1935, drilled to 10,034 ft. but plugged back to the 8,300-ft. zone where it showed some oil and gas but was temporarily abandoned. Work was resumed in August 1941. Present objective is the 10,000 to 11,000-ft. zone to make further tests of shows found in the original drilling.

Stanolind Pipe Line Co. made connections and was running some 350 bbl. a day to make up for shut-down time. Allowable production of the well is 150 bbl. a day.

The last report on Stanolind-Amerada 1 Cushing, Coal County gas discovery, was that further drill-stem tests were being made at 3,654-81 ft. Gas flow was gaged at 5,300,000 cu. ft. and there was considerable salt water in the hole.

Southwest Texas Fields

(Continued from Page 114)

H.&G.N.R.R. Sur. 67, A-233, dry at 5,696 ft.

Humble Oil & Refining Co. has moved in rig for a test on the R. F. and C. A. Werland land, 2 miles west of the Brushy Creek field, in De Witt County. It is reported to have a block of 25,000 acres, and other large companies have leases in the area, which produces a high-grade distillate for aviation gasoline. A recycling plant is to be constructed. Humble has staked location for 1 M. A. Evetts, a wildcat test in the M. Lopez Survey, Jim Wells County.

G. W. Strake, who opened the Strake field in Duval County with his 1 Yates, has filed notice of intention to drill five more wells in that field, to the east, northeast, southeast, southwest and northwest of the discovery. They are the 2, 3, 4, 5, and 6 Yates ranch. He has received permission from the Railroad Commission to make a dual completion of 1 Yates, using gas from the Government Wells sand to produce oil from perforations at 3,723-31 ft.

Increased drilling activity is expected following completion of Gulf Shore Co. 1 Garcia, in the Ulrich area of Starr County, which came in making 32 bbl. of oil daily while still cleaning. It is a mile north of the Boyle field and a few miles southwest of the Rincon field, proving up the Ulrich wildcat sand. Blocks of leases in the district are held by several independent operators. The 1 Garcia is the first producing well finished in the Ulrich area since Fidelity Oil & Royalty 1 Sugarland Industries was brought in last July.

More BEARING Mileage with STROM STEEL BALLS

For over a quarter century Strom has concentrated on Metal Balls. Strom Balls possess a degree of surface smoothness and sphericity that is unequalled in any other regular grade of ball. . . . Correct hardness, physical soundness and size accuracy in all Strom Balls is assurance of More Bearing Mileage. For longer trouble-free bearing life specify Strom Metal Balls in ALL ball bearings.

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SPANG CABLE TOOLS

Conserve your equipment to bring Victory closer! And start with the best equipment you can get. For cable-system drilling and fishing, that means SPANG "Higher Standard" CABLE TOOLS. Available through supply stores.

SPANG & COMPANY
Butler, Pa

Equipment Progress

High-Pressure Check Valve Leakproof at 25,000 Lb.

A high-pressure check valve that permits a larger passage of fluids or gases, yet gives instant leakproof shutoff at all pressures up to 25,000 lb. per sq. in. and operates in any position has been developed by Martin-Decker Corp. of Long Beach, Calif.

While particularly designed for all high-pressure work, the valve nevertheless unseats at the slightest pressure, an important feature where initial low pressures are encountered. The instant fluid or gas flow reverses from the desired direction, the valve snaps shut and increased pressure only causes a tighter sealing of the valve, preventing leakage in either direction and completely closing off reverse flow.

Internal parts consist simply of a valve with integral packing ring and spring. All machined parts are accurately made for perfect fit and are extremely sturdy and durable. Construction is such that the valve can be easily taken apart with only a wrench whenever required. Packing rings will handle a wide variety of fluids or gases.

Three Star Award to International Nickel

Announcement of the conferring of the fourth production award upon the Huntington Works of International Nickel Co. at Huntington, W. Va., has been made by Robert C. Stanley, chairman and president, following official notice from the U. S. Navy.

Notice of the latest honor to the plant was contained in a letter to Mr. Stanley from Admiral C. C. Bloch, U.S.N., retired, chairman of the Navy Board for Production Awards. The award gives the plant the right to fly the Army-Navy "E" with three stars. Previously the Huntington Works had received the Naval Ordnance award, followed by renewal in the form of the All-Navy "E" award with one star and later the Army-Navy "E" with two stars. Each star represents the renewal of production honors for a 6 months' period. The plant was among the first 14 in the entire United States to receive the original honor and the first in the entire Fifth Naval District to receive all of the first three.

Trade Literature

Willamette Hyster Co., Portland, Ore.—Condensed Catalog A-297 listing the company's several models of winches for Caterpillar tractors. This 16-page catalog is printed in two colors and is copiously illustrated.

Blaw-Knox Co., Pittsburgh, Pa.—A 15-page bulletin (No. 1869), containing suggestions for the elimination of dust from gas, lowering gas maintenance and transport costs, effective methods of reducing service complaints and improving public relations. The booklet is copiously illustrated.

Army-Navy "E" Award to Butler Manufacturing Co.

Some 2,500 employes and friends witnessed a unique ceremony commemorating the award of the Navy "E" to the Kansas City plant of Butler Manufacturing Co.

Preceding the formal presentation by Col. Malcolm Elliott, Army Engineers Corps, and Lt. Comdr. Nathan Young, Officer Procurement Section of the Navy, a dramatic sketch was broadcast over a half dozen radio stations. The sketch, entitled "The Lines That Form Shall Never Break, Because of Things We Failed to Make," simulated the use of the company's war products in combat service around the globe.

The Butler factories produce a score of different products for the armed forces, including steel landing mats, steel hangars, living quarters, machine shops, supply warehouses, and truck tank and trailer tank-refueling units.

OIL WELL SUPPLY CO. AWARDED ARMY-NAVY "E"

More than 1,500 persons gathered at the plant of Oil Well Supply Co., Oil City, Pa., to take part in the ceremonies attendant to the plant receiving the Army-Navy "E" award last week.

Col. J. L. Guion, of the U. S. Army, presented the pennant to E. H. Roos, works manager. Capt. F. L. Oliver, U. S. Navy, retired, presented "E" pins to four outstanding workers at the plant as representatives of all the employes.

The ceremonies were held in one of the buildings at the plant and all Oil Well shop men as well as officials were present. The program was interspersed with stirring patriotic marches played by the Oil City High School band.

Both the plant and its workers received high praise for the part they are playing in the war effort from the representatives of the Navy and the Army.

Col. J. L. Guion, G. E. Mohnkern, W. A. Farringer, E. D. Meese, A. W. Snyder, E. H. Roos and Capt. F. L. Oliver, at the presentation ceremonies

NATIONAL SUPPLY GIVEN THIRD PRODUCTION AWARD

National Supply Co. was the recipient of its third war-production award on February 10 with the presentation of the Army-Navy "E" to the employes of its Toledo, Ohio, plant. The two previous awards consisted of the Army-Navy "E" at the Ambridge, Pa., plant and the U. S. Maritime Commission Victory Fleet Flag and Maritime "M" pennant to the Superior Engine Division at Springfield, Ohio.

Presentation of the Toledo plant award flag was made to President A. E. Walker by Rear Adm. William C. Watts, U.S.N., retired.

Col. Ernest O. Rudelius presented "E" pins to the four oldest employes of the plant whose tenure ranged from 44 to 51 years of continuous service. Pins were accepted in behalf of the employes by J. S. Biscay, president, National Supply Unit, U.A.W.-C.I.O.

Governor Saltonstall, of Massachusetts, gave the principal address and paid tribute to the workers and management.

President A. E. Walker, of National Supply Co., receives the Army-Navy "E" pennant from Rear Admiral William C. Watts, U.S.N., retired, at Toledo

Among Equipment Men

Cooper-Bessemer Courses Develop Employe Education

To help enterprising workers of both factory and office attain more responsible positions in the company, Cooper-Bessemer Corp., diesel-engine and compressor builders, recently announced a training plan for developing employes' education along scientific lines.

According to Ralph L. Boyer, the corporation's chief engineer, who worked out the details of this program, the idea is in line with the company's policy that employes should be encouraged to further their education and thus fit themselves for advancement in the war industries.

In announcing the plan, officials of the company, which operates plants at both Mount Vernon, Ohio, and Grove City, Pa., explained how these arrangements were made possible through the cooperation of the regional head of the Office of Engineering, Science and Manual Defense Training, Ohio State University.

The subjects, chosen from a list of government-approved Extension Defense Courses, as presented at Ohio State University, cover fundamental engineering drawing, and the engineering essentials of tool, jig and fixture design.

Classroom activities, held at the Cooper-Bessemer plant, include lectures and laboratory exercises, dimensioning, working drawings, recitations and tool design. Three-hour sessions are conducted two nights a week, and, to complete a course requires from 12 to 16 weeks.

Instruction is under the supervision of two veteran employes of Cooper-Bessemer Corp.; one a recognized draftsman and the other an expert tool designer. Both are paid by the federal Government.

Clinkscales and Green Address Tulsa Nomads

S. R. Clinkscales, in charge of the Tulsa office for the materials division of PAW, District 2, was the principal speaker at the monthly luncheon of the Tulsa Nomads, February 22. W. G. Green, of Engineering Laboratories, Inc., Tulsa, and former president of the Tulsa Nomads, also spoke briefly. Mr. Green has been a member of the Civil Air Patrol with headquarters at Corpus Christi, Tex., for several months.

Ben F. Kelley Forms Company

Ben F. Kelley, formerly part owner and an officer of the Shaffer Specialty Co., and a representative of oil-field equipment manufacturers in the Mid-Continent for several years, has organized the Ben F. Kelley Co., Tulsa. The new firm will market and manufacture the Kelco safety spinning line cathead, the Kelco air-operated safety rotary pipe slips, Kelco safety air-operated wire-line oil saver and other oil-field equipment.

Goodrich Man to Washington

Chester F. Conner, manager distributor sales, Industrial Products Division, B. F. Goodrich Co., has been appointed to the staff of advisers on mechanical rubber goods in the Office of Rubber Director, War Production Board, Washington, D. C.

Wagner Moved to Tulsa

Karl G. Wagner has recently been moved by Jarecki Manufacturing Co. to Tulsa as a city salesman. He was formerly manager of the company's store in Seminole, Okla.

A. J. Penick Gets Seabee Award of Merit

A. J. Penick, president of Oil Center Tool Co., Houston, Tex., was recently notified by Comdr. E. J. Spaulding, officer in charge of Seabee recruiting in Washington, D. C., to the effect that he had been selected to receive the Award of Merit of the Construction Battalions of the U. S. Navy.

The certificate which bears the seal of the Navy Department states: "This certificate is awarded to Arthur J. Penick in acknowlment of his patriotic contribution to the war effort in obtaining the enlistment of recruits for service in the Construction Battalions of the U. S. Navy."

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE	DISPLAYED—PER INCH
8 CENTS A WORD, minimum charge $2 per insertion.	Classified display advertising set in single or double column style:
SITUATIONS WANTED, 4 cents a word, minimum charge $1.	1 inch ..... 1 time $7.00
BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.	1 inch ..... 13 times 6.50
10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.	1 inch ..... 26 times 6.00
All classified advertising payable in advance.	1 inch ..... 39 times 5.50
	1 inch ..... 52 times 5.00
	Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

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LEASES AND DRILLING BLOCKS

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PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma,
Louisiana and Illinois.
20 Years' Experience
Inquiries Invited
B. D. BUCKLEY
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NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof, in a new HoT spot. 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington. N. M.

FOR SALE: Large and small tracts of proven Fluorspar property, also oil and gas leases on proven structures. W. P. Harley, Bowling Green, Ky.

WANTED TO PURCHASE developed producing oil properties in Kansas or West Texas. Prompt action. C. C. Harmon, Nowata, Okla.

U. S. OIL LANDS, opened by Congress to filing for Government oil lease, 12½% royalty. Want several join filing structure. Small expense. Box B-491, The Oil and Gas Journal, Tulsa, Okla.

FOR LEASE: 320 acres, Walton Co., De Funiak Springs, Florida. Oil struck within ¾ mile. Want production test and wells drilled on lessee's money. Owner, Sue McMun, 3939 3rd. St., Detroit, Michigan.

INVESTIGATE active East Texas oil acreage $3 acre up for quick profits. References Satisfied Investors. E. M. Adams, Marshall, Tex.

FOR SALE: REAL BARGAINS!
New 40-acre lease hot play, one mile from production, $5 per acre; 4000 acre drilling block on structure. Write C. A. Parker, Box 451, Center Texas.

BARTON COUNTY, KANSAS. Improved farm 150 acres rich black soil. Lease and Royalty goes along to whosoever buys it. Write Nettie Ratzlaff, Pawnee Rock, Kansas.

PATENT ATTORNEYS

PATENTS, Trade-Marks. Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

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DELAWARE CHARTERS: Powers broad, taxes low. Many of the largest corporations have Delaware charters. Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

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OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

ROYALTIES

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

WANT to purchase developed West Texas producing oil royalties. Will pay good prices for good properties. Oscar L. Grimes, 305 McBirney Building, Tulsa, Oklahoma.

HELP WANTED

WANTED
Cracking Plant Metal Inspector
Man with several years refinery experience, preferably in operating or engineering work, to serve as Metal inspector of large Dubbs Cracking Plant and other refinery equipment. General Engineering Department work when not engaged in Inspection duties. Medium sized independent Oil Company located in Middle West. Reply Box B-480, The Oil and Gas Journal, Tulsa, Okla.

NOTICE TO ADVERTISERS
Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:
"Applications from those now employed in war industries will not be considered."

HELP WANTED

WANTED
Instrument man preferably with oil refinery experience for development laboratory of large eastern manufacturer. Work includes development new devices for pilot plant. Good opportunity for right man. Box B-482, The Oil and Gas Journal, Tulsa, Okla.

SALES ENGINEER versed in heat transfer requirements of oil and gas industry to assist in product design, correspondence and customer contact—wanted by Mid-Western manufacturer of heat transfer materials—splendid possibilities for advancement and permanent future. Box B-483, The Oil and Gas Journal, Tulsa, Okla.

INDEPENDENT Refiner, Middle West, wants services Process Engineer, preferably acquainted with alkylation or catalytic unit, also Inspector of Materials and Construction at plant, also experienced Personnel and Safety man, also Refinery Maintenance Engineer. State fully education, refinery experience and salary desired. Box B-501, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Chief Chemist or Chemical Engineer for 8,000 bbl. refinery in Central Oklahoma. Permanent position. In reply state education, age experience, draft status, and salary expected. Box B-506, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION DEVELOPMENT ENGINEERS, hot and cold metal working, thoroughly experienced. Excellent opportunity. Box B-504, The Oil and Gas Journal, Tulsa, Okla.

PIPING DESIGN ENGINEERS experienced in development of fittings and tubular specialties, excellent opening for capable responsible men. Give full background first letter. Our personnel knows of this ad. Box B-503, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

GRADUATE PETROLEUM ENGINEER with responsible experience in all phases drilling, production, secondary recovery, pressure maintenance, geology, evaluations, leasing and royalties. Foreign location acceptable. 3B draft classification. Box B-473, The Oil and Gas Journal, Tulsa, Okla.

LAND AND TITLEMAN: Many years experience Oklahoma, Kansas, Illinois. Several years service in legal and land department of major company and as assistant manager of land and production department of active independent producer-refiner. Experienced in scouting, lease, royalty and right-of-way buying and adjustment of damage claims. Expert titleman, typist. Age 40. Married. Excellent health. Draft IV-H. Can furnish new car. Presently employed. References. Box B-496, The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT now employed wishes change for betterment. 20 years experience in accounting, office management and personnel directing. Age 46. Married. No children. Most any location considered. Box B-492 The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT, office manager, 20 years experience, age 44, draft deferred. Box B-500, The Oil and Gas Journal, Tulsa, Okla.

CHEMIST with 13 years technical, manufacturing, and supervisory experience in production and refining. Only positions of responsibility considered. Box B-502, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM SALES ENGINEER available. Thoroughly familiar with petroleum jobber and automotive fleet operations. Eighteen years responsible background representing Pennsylvania Refiner over wide area including Personnel, Distribution, Warehousing and Transportation problems. Some accounting. Age 42. Married. Box B-507, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND MAN, broad experience both field and administrative, excellent legal background, good working knowledge geology and operations, desires connection with active independent able to utilize these varied qualifications. Best company references. Presently employed. Available March 1. Age 38. Draft classification 4-H. Box B-508, The Oil and Gas Journal, Tulsa, Oklahoma.

(Continued on Next Page)

CLASSIFIED ADVERTISING — EQUIPMENT FOR SALE

3 COMPLETE CRACKING UNITS

5,000 barrel topping, 2,200 barrel cracking, 1,000 barrel gasoline recovery plant, car load Ethyl plant, approximately 50 storage tanks from 200 to 55,000 barrels included—
Located—KILGORE, TEXAS

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1,200 barrel cracking unit—Complete, located—ST. PAUL, MINN.

All towers, pumps, valves, fittings, instruments, boilers, and other miscellaneous equipment to be sold separately.

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Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio.

USED Cranes, Shovels, Draglines, Clamshells, Graders, Pumps, Compressors, Generators, Gasoline and Electric Motors, and other Contractors' Equipment. L. A. ROUNTREE, 362 Pierce Street, Gary, Indiana.

FOR SALE—One partial list steam rotary equipment located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

COMPRESSORS—TANKS—FOR SALE
2—Bessemer type 8, direct driven engine and compressors, 80 hp., 180 r.p.m. Engine cylinder 16 x 20 and air cylinder 7 x 20. 2—Bessemer compressors same as above with air cylinder 14 x 20. 3—8,000 gallon capacity steel gasoline storage tanks, size 10'x13'x¼", riveted. Louisiana Iron & Supply Co., Longview, Texas.

FOR SALE: 30,000 barrel oil storage tank, condition perfect. F. H. Gregory, Pharr, Tex.

4—Lucey boilers & headers, Ideco drawworks, Ideal & Oil Well twin cylinder drilling engines, 18" Wilson-Snyder, & 14" Ideal pumps, 6" Gray Swivel, Boykin rotary, drill cables, boiler feed pumps, Ideco crown block, engine substructure, engine skids, 122' steel derrick & substructure, traveling block & hooks, Moon generator, 9000' 4½" & 3½" drill pipe, 1000' of 4" Victaulic pipe, blowout preventers, Brewster core reel & lime, Xmas tree, 1000 bbls. Parkersburg tanks, and other equipment. First class condition. Prices right. For particulars communicate Sorrento Petroleum Corp., American Bank Bldg., New Orleans, La.

Second hand Oklahoma City alloyed sucker rods, ¾", ⅞" and 1".
Sucker Rods, Fishing Tools, Tubing Spiders, Tubing Catchers, all sizes.
Structural Steel and Reinforcing Rods.
M. R. TRAVIS
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DIESEL—GAS—ENGINES
Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: At Oklahoma City 4 Parkersburg #4901-C, 424,000# capacity, 123' Rotary Derricks. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: Complete steam rotary drilling rig with 126 foot steel derrick and equipment located in Wyoming-Montana Field. Box B-505, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: 1—Wilson Giant Model Double Drum Drawworks, spudder attachment, chain type transmission with JL 1335 Buda 180 HP Engine, all mounted on steel skids. A-1 condition. Price $6250.00 FOB Seminole, Oklahoma.
1—Large Rotary Drilling Rig, powered with 2 LRO 300 HP Waukesha Engines, 42" heavy duty Houston Portable Clutch, #1805 Johnson Oil bath drawworks, 18P Wilson-Synder Power Pump, 27½" Johnson Oil bath Rotary table with heavy crown and Traveling Blocks, and all accessories. Price complete $37,500.00 FOB Seminole, Okla.
1—RL Cardwell Double Drum Drawworks with spudding assembly rotary table drive, 7¼ x 14 Gardner-Denver Power Pump, Oil bath rotary table—with all accessories to make rig complete in every respect, and 1—94' Lee C. Moore Cantilever Derrick. Price less drill pipe, $27,500.00.
H. A. McCARTHY
Tulsa, Okla.
2538 S. Norfolk Phone 4-5791

6—RECONDITIONED automatic stop and check valves, three inch, Series thirty, flanged. Industrial Supply & Equipment Co., Inc., 338 Baronne St., New Orleans, La.

HORIZONTAL STEEL TANKS

6—10 Ft. dia. by 30 Ft. Long.
2—10 Ft. dia. by 29 Ft. 6 In. Long.
2—9 Ft. dia. by 30 Ft. Long.
10 Above Tanks in Western Kansas,
3—4,000 Gal., 2—6,500 Gal.
2—10,000 Gal. in Ohio and Pennsylvania.

VERTICAL TANKS

29,000 Bbl. 90'6" x 25'6"
19,600 Bbl. 75' x 25'5"
2—7,500 Bbl. 44' x 26'
5,500 Bbl. 37'6" x 27'6".
Located in the East.

1500 BBL. ATMOSPHERIC DISTILLATION REFINERY

700,000 Gal. Storage Cap., 1500 Bbl. Tube Still, 1500 Bbl. Fractionating Tower, 150 H.P. Boiler, Pumps, Compressors, Condensers, Heat Exchangers, Agitators, Loading Rack, etc.

R. C. STANHOPE, INC.

60 East 42nd St. New York, N. Y.

5—7½"x20" Type VS, 500-lb. W. P. Clark Compressor Cylinders complete with clearance pockets. Call or write Cimarron Gasoline Corp., Box 246, Coyle, Okla.

4—40 H.P. used Webber gas engines completely rebuilt and guaranteed by Borger Gas Engine Company; also 1—40 H.P. used Franklin gas engine. Full particulars on request. Haze & McGill, 516 Harrison Street, Amarillo, Texas.

FOR SALE—Bolted Tanks 5000 and 10,000 barrel capacity API construction, practically new. Feldman Petroleum Company, 544 W. Roosevelt Rd., Chicago.

FOR SALE: Lufkin pumping unit suitable for 4000' well. Melton Supply Co., Seminole, Okla.

7—Used V-Belt Sheaves, Diameter 20" to 50". 1—Cut Down and Remodeled Union Tool No. 5 Draw Works with American Cathead and Lucey Reverse Clutch. 1—150 H.P. Fairbanks-Morse Diesel Engine, Model 47. 3—100 KVA Wagner Transformers, Type H.E. Beardmore Drilling Company, Wichita, Kansas.

2— 565 HP at 1200 RPM 8 Cyl. Sterling Comb. Gas Engines, Direct connected to 300 KW 480 Volt 60 Cycle General 3 Phase Electric Generators Alternating Current Complete.
2—165 HP at 1800 RPM 6 Cyl. Sterling Comb. Gas Engines Direct connected to 100 KW 400 Volt 3 Phase 60 Cycle A.C. General Electric Generators Complete.
4—200 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
3—150 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
1—75 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
MAJOR TOOL & SUPPLY CO.
Oklahoma City, Okla.

FOR SALE—135 ft. ¾" x 4" woven Brake Lining. Jack Monroe, 2919½ S. Catalina St., Los Angeles, Calif.

WAUKESHA - HESSELMAN OIL ENGINES, REBUILT. 4 Cylinder 25 hp. with natural gas conversion. 6 Cylinder 130 hp. equipped with special governor. DIESEL ELECTRIC ENGINEERING CO., 14 N. Clinton St., Chicago, Ill.

FOR SALE—Bessemer Gas Engines, Compressors and repair parts. Vessels, towers, pumps, Chaplin Fulton regulators, Fisher liquid level controls, vacuum, pressure & temperature recorders, meters, valves, fittings, pipe and other miscellaneous material. GILBERT PIPE & SUPPLY, Electra, Texas.

STANDARD CABLE OUTFIT, all steel, complete tools, bits 20" to 6" with stems, jars, sockets, bailers, etc., lighting plant, boilers, engines. Sell complete or separate items. S. W. Pressey, Pueblo, Colorado.

FOR SALE: Russell, Kansas, 1-122' American Steel Angle Iron Derrick knock-down, capacity 246,000#. Cities Service Oil Company, Patridge, Bartlesville, Okla.

FIRE TUBE BOILERS
(New or Used)
ONE WEEK'S DELIVERY AFTER RECEIPT OF ORDER
MOORE & COMPANY
1701 Nat'l Bank of Tulsa Bldg.
Tulsa, Oklahoma
Telephone 2-0058

1—4" Shell 4' x 40' Forged Steel Reaction Chamber
1—½" Shell 5' x 74'—4000 barrel cap.—Crude Oil Fractionator with Trays.
120—Pieces 3" I. D.—3½" O. D.—30' long—Chrome Tubes.
30—Pieces 3½" I. D.—4" O. D.—21' to 28' long—Chrome Tubes.
162—3½" O. D.—6½" Centers—Chrome Key Headers.
30—Pumps, various sizes and types.
A. C. BARTSCH
BOX 127, FOREST PARK, ILLINOIS

Classified Advertising

EQUIPMENT FOR SALE

FOR SALE: Two complete Tom Dietle Mast Casing Pulling Machines. Will sacrifice for cash. K. D. Emrick, Box 108, Seminole, Okla. Phone 1468.

1—Used 7x8 Worthington Vertical Triplex power pump, cheap. INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 338 Baronne St., New Orleans, La.

USED ADMIRALTY Metal Condenser Tubes as good as new. One steel Building 64 feet by 206 feet. One Steel Building 50 feet by 280 feet. Industrial Supply and Equipment Co., Inc. 338 Baronne Street, New Orleans, La.

FOR SALE

2—95 H.P. Mercury skid type power units with transmissions. 2—Portable air cooled engine driven 1500 watt electric light plants. 1—100 H.P. Miller direct-driven, 2 stage compressor. 1—80 H.P. Bessemer single stage compressor. 1—15 H.P. Bessemer gas engine. 4—25 H.P. Bessemer engines, push & pull powers & power houses. 1—5½ Keystone drilling rig complete with tools. 6000 ft. of 4⅞" casing. 9000 ft. of 6¼", 13# casing. 4000 ft. of 4½" A-1 rotary drill pipe. 3500 ft. of 3½" first grade rotary drill pipe.

Veeder Supply & Development Co.
Cherryvale, Kansas

FOR SALE — One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE—Approx. 6500 ft. 6⅝" OD 25.20# drill pipe with Reed Full Hole Shrink Grip Tool Joints, A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

BUCKEYE Model 15 ditching machine. T. & L. Construction Co., P. O. Box 79, Phone 2653, Centralia, Ill.

1-#2 NATIONAL DRILLING Machine, wooden mast. Call or write E. M. Howard, Rising Star, Texas.

STEEL TANKS FOR SALE

220,000 Ga. Cap. 43 Ft. Dia. 20 Ft. High Riveted Construction.
2—12,000 Gal. & 1—6,500 Gal. R.R. Car Tanks.

L. M. STANHOPE
Wayne, Penna.

FOR IMMEDIATE SHIPMENT FROM STOCK

125—20" Dresser Couplings complete with with Rubber Rings and Bolts, perfect condition.

50—30" Dresser Couplings complete with Rubber Rings and Bolts, perfect condition.

BROWN-STRAUSS CORPORATION
Box 78
Kansas City, Missouri

EQUIPMENT WANTED

WANTED: Well servicing units in good condition. All makes and sizes considered. We pay cash. Melton Supply Co., Seminole, Okla.

WANTED

Abandoned Pipe Lines, in or out of the ground, Oil Wells, Steel Buildings and Steel Storage Tanks of all sizes.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair Co., Illinois.

EQUIPMENT WANTED

WANT TO BUY: PA-100 h.p. International Engines. FOR SALE: 1000-barrel riveted tank, several 500-barrel riveted tanks. Address Box 896, Sapulpa, Oklahoma.

WANTED TO BUY: Complete outfit, pulling jacks, 10' length. Able to pull 5,000' of 7" pipe. Write Joe Rubin, 1900 19th Street, Parkersburg, W. Va.

LOOK! LOOK!

To buyers and dismantlers of refineries, distilleries, breweries, and all kinds of industrial plants:

A large industrial consumer is constantly in the market for the following materials:

Steel valves and fittings, both flanged and screwed

Welding fittings

Tanks and pressure vessels

Recording instruments and gauges

Motors and electrical equipment

Pipe, seamless, lap, and continuous weld

Pumps and engines

Send stock lists of new or used materials to

P.O. Drawer 465, Chicago, Ill.

RANCHES AND FARM LANDS

2000 ACRES IMPROVED livestock farm, Choctaw County, Oklahoma. On Federal Highway. Abundant water, pasture, meadow, timber, and arable land. Excellent building sites. J. J. Thomas, Seward, Nebraska.

GEOLOGISTS

WANTED GEOLOGIST: Reliable party will furnish money to buy acreage and give interest in exchange for professional services. Box B-490, The Oil and Gas Journal, Tulsa, Okla.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

REAL ESTATE

WINNFIELD, LA.

Center of North Central Louisiana oil activity, invites oil men and oil concerns to make their homes and headquarters at Winnfield.

TOWN OF WINNFIELD
City Hall — Winnfield, La.

Kansas Fields

(Continued from Page 129)

Stern, Butler County: H & M Drlg. 1-A Frank Tobing, SE SW SE 21-27-6e, pumped 35 bbl., Mississippi lime 2,710-25 ft.

Trapp, Russell County: Cities Service 5-C Bender, NW NW 26-15-14w, dry, T.D. 3,346 ft., Arbuckle 3,337 ft.

Wilkins, Ellsworth County: Cities Service 2-C Ploog, N½ NW NE 32-17-9w, dry, T.D. 3,261 ft., Arbuckle 3,254 ft.

Witt, Russell County: National Ref. 1 Boxberger, SW NE SW 3-14-14w, pumped 435 bbl., Lansing 3,005-15 ft., T.D. 3,251 ft.

NEBRASKA

ST. JOSEPH, Mo.—Cities Service Oil Co.'s new Bartlesville sand producer, the 1 Jim Cook in NW NW NW 32-65n-39w, Atchison County, Missouri, was said to be averaging 28 bbl. of water along with some 20 bbl. of oil.

Fisk & Hatcher 1 Black in NE NE 29-9s-20e, Jefferson County, Kansas, in the McLouth pool, was a dry hole. There was a show of oil at 1,464-73 ft., total depth. The hole had 200 ft. of heavy black oil, but was abandoned.

Charles Miller 1 Jeannin in NE NW 7-10s-21e, Leavenworth County, Kansas, bailed 1½ bbl. of oil in 1 hour. McLouth sand was topped at 1,386 ft. with a show of oil, and Mississippi lime was found at 1,412 ft.

R. L. Ferguson and Edwin S. Towle were preparing to spud 1 Della Ehbauer in NW NW NE 2-2n-15e, Richardson County, Nebraska, 2 miles northeast of Verdon.

Crude-Oil Prices

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	...	...	...
19-19.9	.84	...	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	...	1.07	1.30	.94
32-32.9	...	1.09	1.32	.96
33-33.9	...	1.11	1.34	.98
34-34.9	...	1.13	1.36	1.00
35-35.9	...	1.15	1.38	1.02
36-36.9	...	1.17	1.40	1.04
37-37.9	...	1.19	1.42	1.06
38-38.9	...	1.21	1.44	1.08
30-39.9	...	1.23	1.46	1.10
40 and above	...	1.25	1.48	1.12

*Includes Lea County, New Mexico.

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Journalisms:

NEAR-DESERT conditions plus a thick salt section have always made mud-conditioning a complex problem in many West Texas fields. A staff article in next week's Engineering and Operating section describes in detail the mud-conditioning system used in one of the new fields in that sector.

WITH equipment performing greater tasks for longer hours than ever before the question of maintenance becomes all-important. A shutdown now involves more than income lost during the time necessary to replace or repair a piece of machinery as there are few replacements possible. In next week's issue, E. H. Lamberger, petroleum engineer of Westinghouse Electric & Manufacturing Co., tells how to care for electrical equipment so as to make it give maximum service.

A SIMPLE diagram which can be used for rapidly determining the amount of fluid in a horizontal cylindrical tank will also be published next week. By means of this diagram, gage poles can be calibrated for individual tanks which can be read directly in gallons.

THE Practical Refining series is continued next week with a handy rule for determining the steam consumption of reciprocal pumps. This series has met with an enthusiastic response from refinery engineers and there are indications that engineers in other branches of the industry are also finding it useful in their work. Petroleum engineering cannot be subdivided into distinct fields and the current trend is to more complete integration of the different departments. If the Journal had not always worked on this principle, it would be convinced now by the wide interest in all branches being displayed by the men who actually get the oil out of the ground, through the refinery and into the hands of the Army, Navy and other consumers.

CALENDAR

March

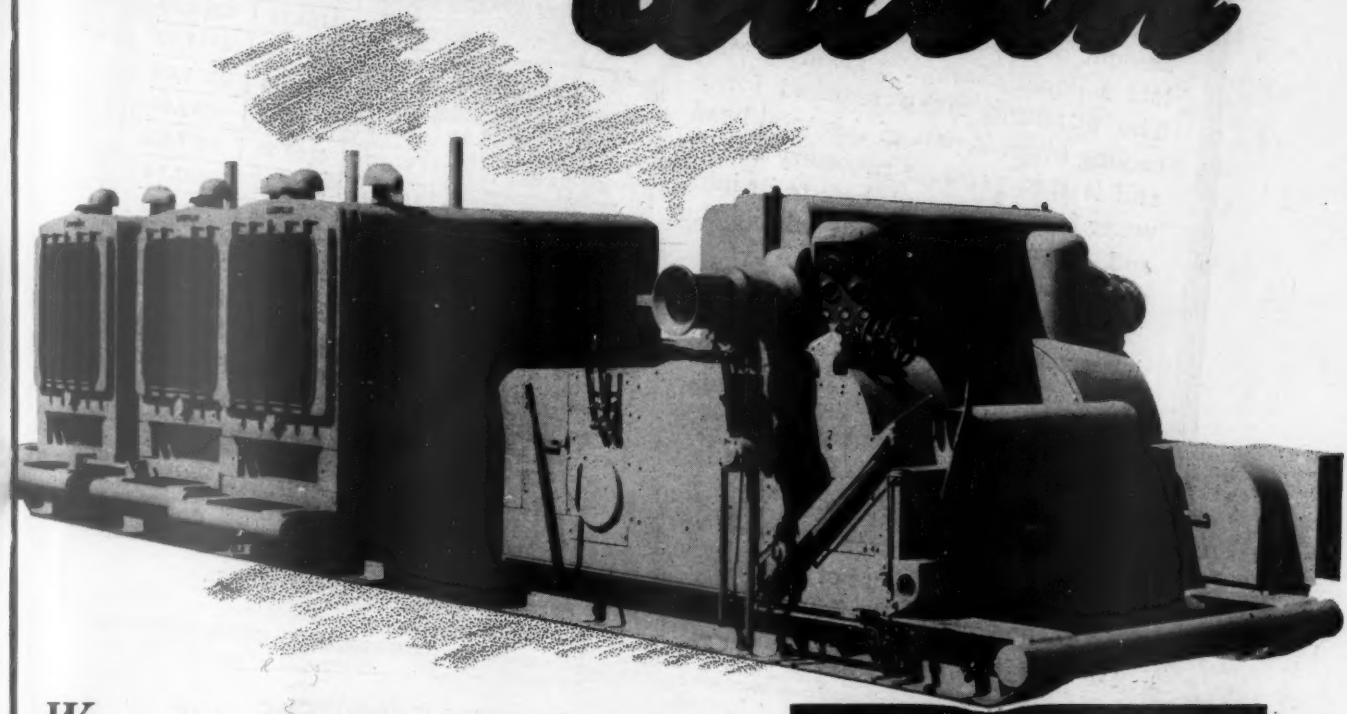
SOUTHERN SAFETY CONFERENCE, fifth annual meeting, Hotel Peabody, Memphis, Tenn., March 1-2.

NORTH TEXAS OIL AND GAS ASSOCIATION, annual meeting, Wichita Falls, Tex., March 6.

PETROLEUM INDUSTRY COMMITTEE, marketing committee for District 2, 624 S. Michigan Avenue, Chicago, Ill., March 9.

AMERICAN GAS ASSOCIATION, war conference on industrial and commercial operations, Detroit, Mich., March 11-12.

A MIGHTY DRILLER IS YOUR "Wilson"



WHAT'S true of a soldier is also true of a rig . . . when the going is the toughest . . . the test is the greatest . . . that's when the real quality and fiber show up.

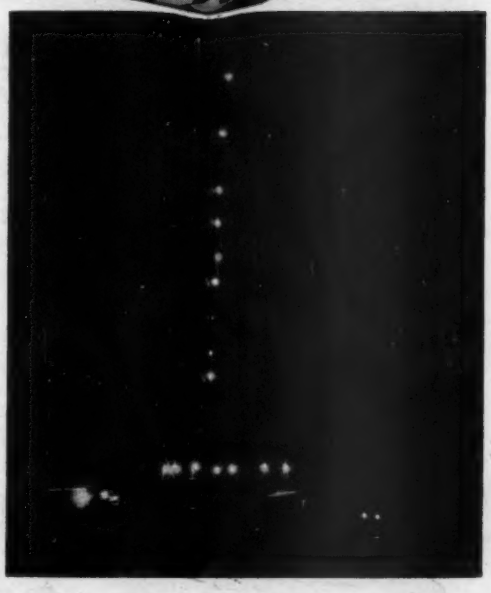
Drilling equipment is today going through its greatest test. It not only has to withstand the beating of normal usage, but is definitely required to double, triple and possibly quadruple its former service.

Under this most grueling of all tests comes to light the ruggedness and outstanding efficiency of the Wilson Rotary Power Drilling Rig.

Men fortunate enough to have a Wilson Rig during these times are doubly appreciative of its many remarkable features, ruggedness, and stamina, which "see them through" a period when new equipment is difficult to obtain, and repair parts hard to get.

Exclusive Wilson features, such as: Flame hardened brake rings; air controlled transmission with "speed lock" which prevents shifting at speeds that damage transmission; full circulating water-cooled friction clutches in drum; internal expanding shoe type clutch; automatic friction clutch air pressure control system; high and low speed friction drum clutches, with finger-tip air controls, and manual emergency control. These and other important advantages help the operator to be grateful for a Wilson in times like these.

Yes, "A MIGHTY DRILLER IS YOUR WILSON." And we suggest that you keep it in fighting shape by giving it proper attention and care. Keep it well lubricated; repair when needed. Operate it in a common sense manner. The result will be profitable, satisfactory service.



Wilson

MANUFACTURING COMPANY, INC. WICHITA FALLS • TEXAS

EXPORT REPRESENTATIVE • GUY E. DANIELS • 30 ROCKEFELLER PLAZA • NEW YORK CITY

PACIFIC COAST DISTRIBUTOR • H. & B SALES CO., LTD. • LONG BEACH • CALIFORNIA

A LESSON IN WATER COOLING

LESSON 1 OF A SERIES

PUMPING COSTS

TOTAL PUMPING HEAD is the amount of pressure required to circulate a liquid through a given system. The PUMPING HEAD required for a cooling tower is part of this total head and is that pressure necessary to lift water from the tower's base to its inlet and overcome friction within the distribution system.

The table indicates how very important PUMPING HEAD actually is when measured in terms of operating cost. These costs as tabulated will vary for any given installation in direct proportion to the actual GPM circulated and the power rate in effect.

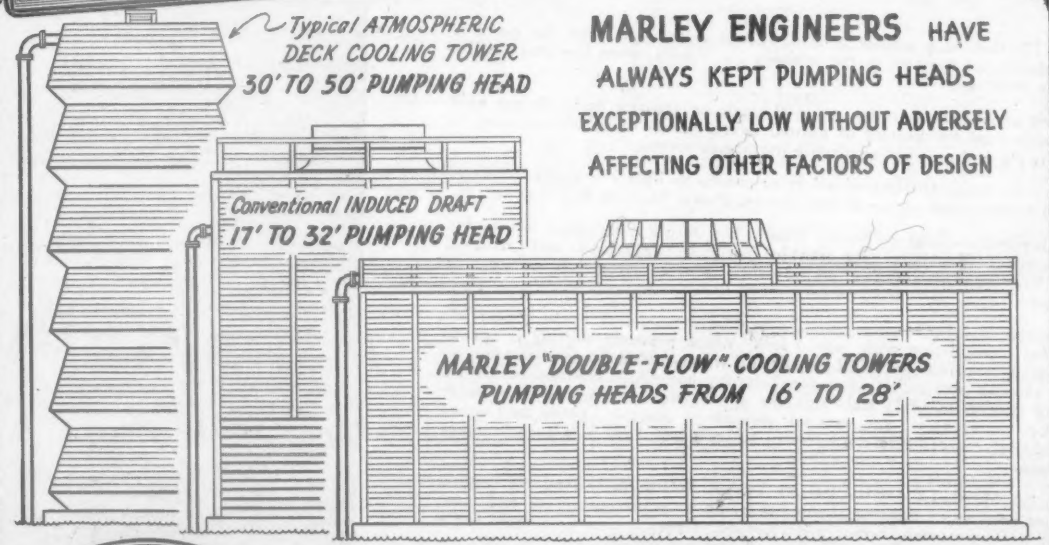
Unlike other tower operating costs resulting from the use of power, pumping head is generally figured on a full-time maximum GPM basis since this constitutes normal operating practice. Therefore any additional or unnecessary pumping head becomes a large factor in the complete comparative cost analysis so necessary for the intelligent selection of a cooling tower.

Relative pumping heads required by cooling towers of different types, designs and "makes" deserve the most careful study and comparison.

Cost Per 1000 GPM

at 1¢ per KWH and 70% Pump-and-Motor Efficiency

Pump Head	24 Hr. Day	30 Day Month	365 Day Year	Five Years	Ten Years
15'	$ .97	$29.10	$354.05	$1770.25	$3540.50
20'	1.29	38.70	470.85	2354.25	4708.50
25'	1.62	48.60	591.30	2956.50	5913.00
30'	1.94	58.20	708.10	3540.50	7081.00
35'	2.26	67.80	824.90	4124.50	8249.00
40'	2.58	77.40	941.70	4708.50	9417.00
45'	2.91	87.30	1062.15	5310.75	10621.50
50'	3.23	96.90	1178.95	5894.75	11789.50

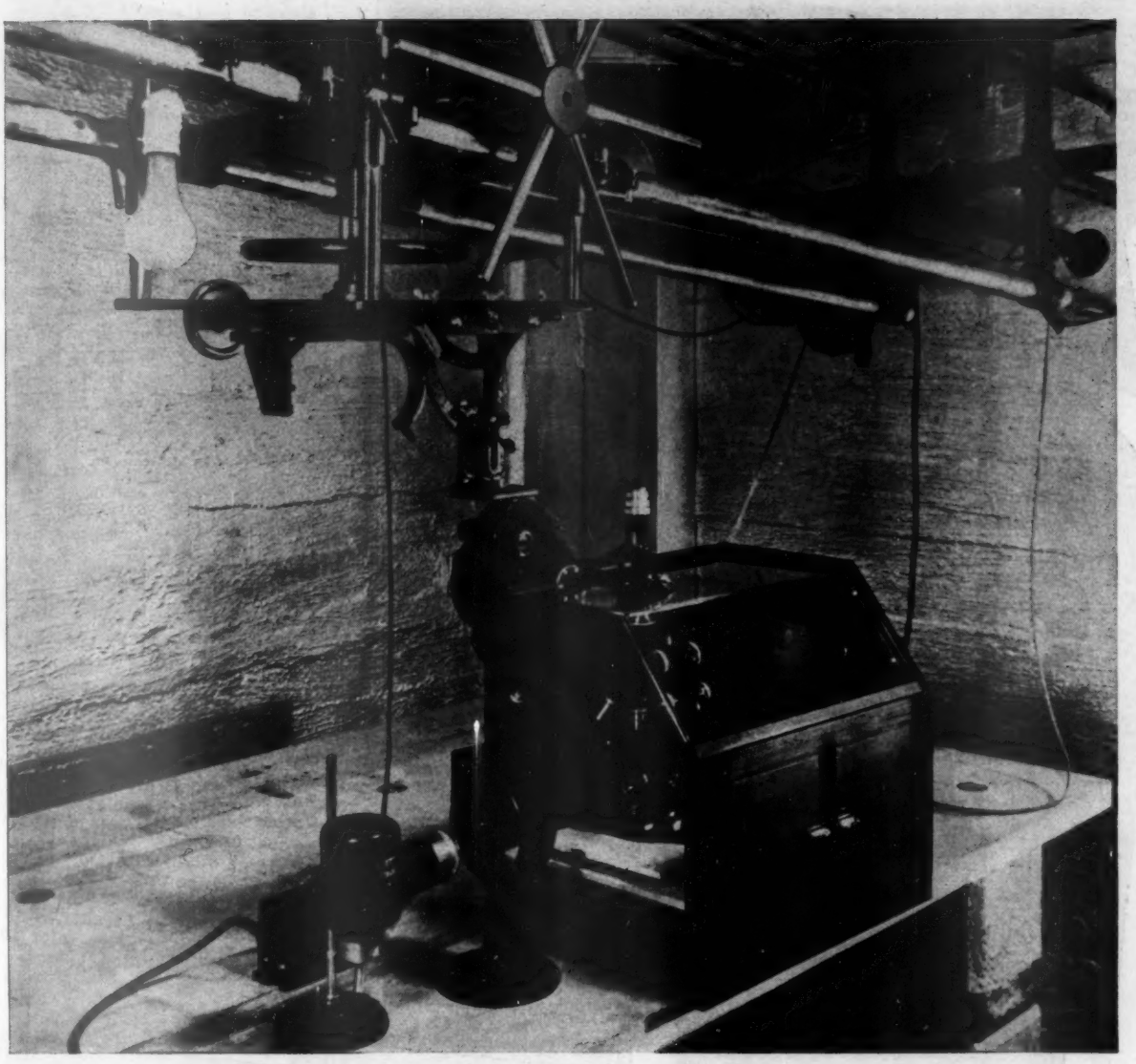

Typical ATMOSPHERIC DECK COOLING TOWER
30' TO 50' PUMPING HEAD
Conventional INDUCED DRAFT
17' TO 32' PUMPING HEAD
MARLEY "DOUBLE-FLOW" COOLING TOWERS
PUMPING HEADS FROM 16' TO 28'

MARLEY ENGINEERS HAVE ALWAYS KEPT PUMPING HEADS EXCEPTIONALLY LOW WITHOUT ADVERSELY AFFECTING OTHER FACTORS OF DESIGN

MARLEY COOLING TOWERS

THE MARLEY COMPANY, INC.

FAIRFAX AND MARLEY ROADS — KANSAS CITY, KANSAS



Rubber soaks up the jiggles— now doctors read the truth

A typical example of B. F. Goodrich development in rubber

MEDICAL men save lives by knowing how human tissues grow, change, develop. But doctors can't live with eyes glued to microscopes. Photographing growing tissues automatically, in successive stages, through powerful magnifying lenses, would save time, and also provide a better and permanent record.

But the slightest vibration in the object being photographed ruins results, makes the prints look like graphs of jiggles instead of photographs of human tissues. A St. Louis scientist had an idea — design a table whose legs would be made of alternate layers of concrete for solidity and sponge rubber to absorb vibration.

But the rubber would have to be strong enough to support the heavy concrete without flattening out, soft enough to absorb the vibration passed through the ground, yet not soft enough to set up any swaying action.

B. F. Goodrich engineers were asked to find the right kind of rubber, and the table was built. There were *no* vibrations even when heavy traffic thundered by the hospital . . . and another improvement in medical science had been made.

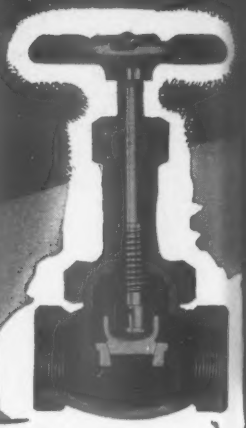
Development work like this continues, even during today's drastic rubber restrictions, and many improvements in rubber products will be ready by the time war is ended. *The B. F. Goodrich Co., Industrial Products Div., Akron, Ohio.*

B.F. Goodrich

FIRST IN RUBBER

WALWORTH

VALVES
FITTINGS
TOOLS



BRONZE VALVES

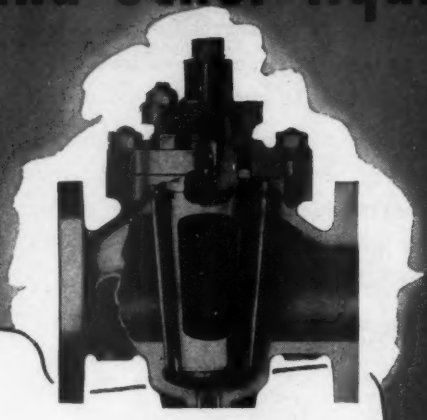
Gate, Globe, Angle and Check—These Walworth types are made for all pressures, temperatures, and services for which bronze valves are suitable. Walworth No. 225P Globe Valve, illustrated, has a stainless steel, plug type, seat and disc, heat treated to a minimum of 500 Brinell hardness. Boiler scale, sand, grit, and other foreign particles cannot mar the surface of either the seat or disc. Wire-drawing is practically eliminated. Extra large stems and long stem threads have been provided to decrease thread wear and increase valve life. Every part has been designed to assure maximum protection against wear and leakage. For complete information regarding Bronze Valves refer to Walworth Catalog 42, Sections 2-6.

CAST STEEL VALVES

Illustrated at the left is a 12", 1500 lb. Walworth Steel Valve with welding ends. Walworth Steel Valves in all series can be furnished with welding ends, screwed ends, or flanged ends within the limits of war production. The complete line of Cast Steel Valves, in Gate and Globe types, have extra strength and protection due to heavy walls. Deep stuffing boxes eliminate costly leaks. Flow loss at high velocity is decreased by streamlined ports. Every detail of design, metallurgy, and construction helps to assure better and longer service. See Sections 16-17 of Walworth Catalog 42 for complete data on Cast Steel Valves.

AM·OIL·WATER·GAS·AIR

and other liquids and gas s

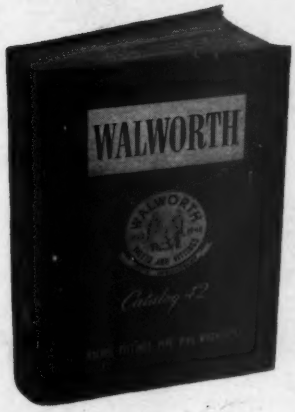


LUBRICATED PLUG VALVES

Some fluids are difficult to control with conventional types of valves—but Walworth Lubricated Plug Valves do the job safely and easily. They may be opened or closed with but a quarter turn of the handle, and have proved their ability to give a dead-tight shut-off. Operation is sure and smooth. All these qualities plus greater protection against corrosion and erosion make Walworth Lubricated Plug Valves ideal for "difficult" jobs. They are made in sizes from ½ to 24-inches and for pressures from 125 to 5000 lbs. Complete information on Lubricated Plug Valves will be found in Section 15 of the new Walworth Catalog.

WALSEAL FITTINGS

For Leakproof "One-piece" Copper or Brass Pipe Lines—Walseal Fittings are threadless bronze fittings into the ports of which the exact amount of silver brazing alloy has been inserted by Walworth at the time of manufacture. Joints are made by inserting the pipe end into the fitting port, then heating both pipe and fittings with an oxyacetylene flame. The result is a *Silbraz Joint* which saves time and effort, and which is silver-brazed—not soft soldered. A brass or copper line made up with Walseal Valves and Fittings is actually a "one-piece" line, leakproof, vibration-proof, shock-proof, and corrosion-resistant. Refer to Section 20 of Walworth Catalog 42 for complete information on Walseal Fittings.



SPECIFY FROM THE NEW WALWORTH CATALOG 42

The new Walworth Catalog 42 is just off the press. It gives the latest information on any question concerning Walworth products. It is clearly indexed and contains complete up-to-date data on valves, fittings, and pipe, including working and test pressures, plus service recommendations. Conformity of metals to A.S.T.M., Marine, and U. S. Navy specifications is given in detail. Dimensions for layout and operation, as well as engineering data, make valve and pipe installations easier and add to the usefulness of this new Walworth Catalog 42. Be sure to get a copy. Fill out and attach the handy coupon to your letterhead.

Address your inquiry to Dept. 27
Walworth Co., 60 East 42nd St., N. Y. C.

Please send a copy of the new Walworth Catalog 42 to:

*Name*_____

*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

Rubber

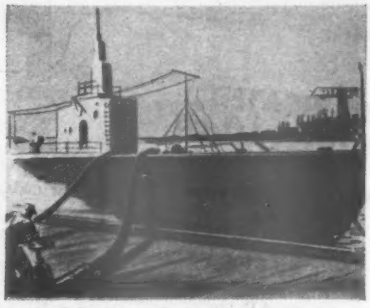
WILL RIDE TO VICTORY ON THE *SEVEN C's*

THE "Seven C's" are ***Conservation,*** to salvage all rubber for re-use; ***Care,*** to make what we have last longer, do more; ***Cooperation,*** in use and allocations; ***Compounding,*** to produce the best mechanical rubber goods within the limits of supply; ***Construction,*** of fabric and reinforcement so that less rubber may do more; ***Collaboration,*** of the entire Rubber Industry for the good of all; ***Courage,*** to pursue research and development relentlessly.

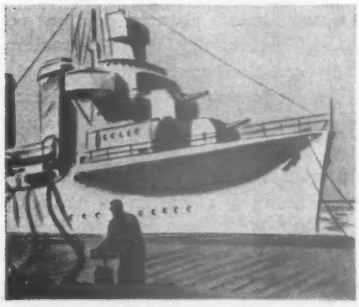
The entire mechanical rubber industry is applying its collective ingenuity, experience and skill from laboratory to shipping platform with results which, at times, may look like miracles to anyone unfamiliar with the sustained research which is an inherent part of the story of Rubber.

In a single airplane there are hundreds of rubber parts, including hose for fuel, oil lines and hydraulic controls; packings, and vibration dampeners.

Tanks need rubber at many points—rubber that will withstand heat, cold, oil, abrasion.



Submarines require acid-resisting rubber for battery compartments; other kinds of rubber in gaskets, mountings, and for scores of special applications.



Thousands of pounds of rubber go into every warship at hundreds of places from propeller shaft to gun decks and fire control tower.

Trucks and gun carriages require rubber for hydraulic brake parts, for shock absorption, and for other vital uses.

50[illegible] OF RESEARCH

THE half century mark now reached at MANHATTAN finds the thousands who work within its several plants too busy to take full note of this milestone in a long record of achievements. Among these are: Compensated Power Transmission Belting in which all plies have equal stresses; the Extensible Tip for prolonging the life of endless belts; the Homoflex hose construction principle which increases the flexibility and multiplies the life of rubber hose—often many times; Radio-Active treated fire hose that resists mildew; first to adapt synthetic rubber in oil-proof rubber products; Vibration Dampener Bushings for portable grinding wheels.

These are but a few of the MANHATTAN developments which are contributing to conservation of rubber by prolonging service life, and to greater production.

THROW YOUR SCRAP INTO THE SCRAP!

KEEP AHEAD WITH MANHATTAN

THE MANHATTAN RUBBER MANUFACTURING DIVISION
of RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES PASSAIC, NEW JERSEY

● On an important base, somewhere outside the U.S., this Diesel generator set is furnishing power for lights, communication, and so on, an indispensable part of our defense system. And to assure that friction, the saboteur, cannot interrupt the flow of essential power, Link-Belt Friction Fighter roller bearing pillow blocks support the main shaft. Neither dirt, heat, nor misalignment can prevent the free-rolling, efficient service of these bearings. The adjustable base plate is also a Link-Belt engineered and manufactured feature of this installation.

Link-Belt Friction Fighter bearings are furnished in roller and ball types, unmounted or mounted. Get Data Book No. 1775 to learn full engineering facts and myriad possibilities for utilizing the free rolling, self-aligning action of Friction Fighters on *your* equipment. Link-Belt Company, Indianapolis, Dallas, Houston, Kansas City, Mo., Los Angeles, New York, Toronto. Distributors in all fields.

8961-A

LINK-BELT

FRICTION FIGHTER

BEARINGS

Roller and Ball Types

Second Unit of "Big-inch" pipe line gets under way *fast!*

TRAINLOAD OF PIPE FOR OIL HUNGRY EAST. Work is well under way in the all-out effort to complete the entire line as soon as possible.

FIRST FIELD STOCK of National 24-inch Seamless Pipe for the second unit of the "Big-Inch" pipe line. It is easy to see how the line got its name when three children can easily climb into one section of the pipe.

IN the amazingly fast construction of the first unit of the "Big-Inch" oil line, one fact cannot be overlooked—it was the manufacture and delivery *on time* of the 24-inch seamless pipe which made possible the remarkable achievement of the contractors.

Meeting unusual demands for production and delivery of large quantities of line pipe is no novelty at NATIONAL Tube. But we must admit that it was not alone our exceptional facilities that enabled us to handle this world's record job—it was also the fine spirit of cooperation of every workman from beginning to end, that made it possible to produce this tremendous amount of large-size pipe within the specified time limits.

Now we are engaged in rolling the pipe for the second unit—642 miles of 24-inch seamless—even a larger order than for the first unit. Again it's a world's record—the longest 24-inch oil line ever undertaken—and, every effort will be made to maintain the former record of pipe delivery, so that more oil will reach the east coast as soon as possible.

Already large stocks of pipe have been delivered to points along the right-of-way and, with continued close cooperation in manufacture, transportation and laying of this pipe, Texas Oil will be flowing to New York and Philadelphia later in the year, through the world's biggest oil line.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

United States Steel Export Company, New York

The "BIG-INCH" LINE

The entire 550 miles of 24-inch seamless steel pipe for first unit was made by NATIONAL Tube Company and finished exactly on schedule.

The order was completed in the record-breaking time of 124 days.

Mills of NATIONAL Tube Company were the only ones in America big enough and fast enough to produce the seamless pipe for this job.

All the pipe was delivered to the right location at the right time so that none of the contractors were held up because of lack of pipe.

Not a minute's time was lost between finishing pipe for the first unit and start of production for the second—operations were continuous.

Pipe for the second unit consisting of 642 miles of 24-inch seamless is now pouring from our mills at a rate of a trainload a day.

This huge amount of pipe is being made without disrupting production of pipe and tubing for bombs and shells, ships, airplanes, tanks, trucks, refineries, synthetic rubber plants and other important war products.

INTO THE DITCH goes a section of NATIONAL Seamless to narrow the gap between Norris City and the East Coast and the "Big-Inch" marches on.

ROUGH TERRAIN. Pennsylvania mud, snow, cold and steep mountain sides are some of the difficulties encountered by the laying crews on the second unit of the "Big-Inch."

UNLOADING OF PIPE is done with care to protect the ends and surface of the pipe.

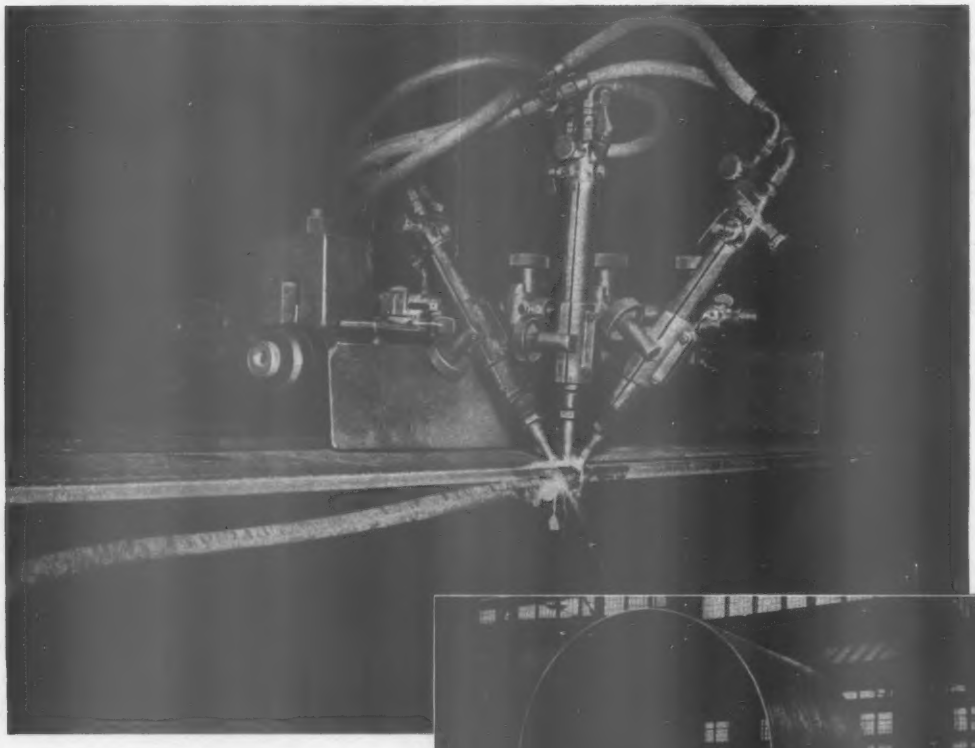
WALLS WITHOUT WELDS

NATIONAL SEAMLESS

UNITED STATES STEEL

ALCO

ENGINEERS AND MANUFACTURERS

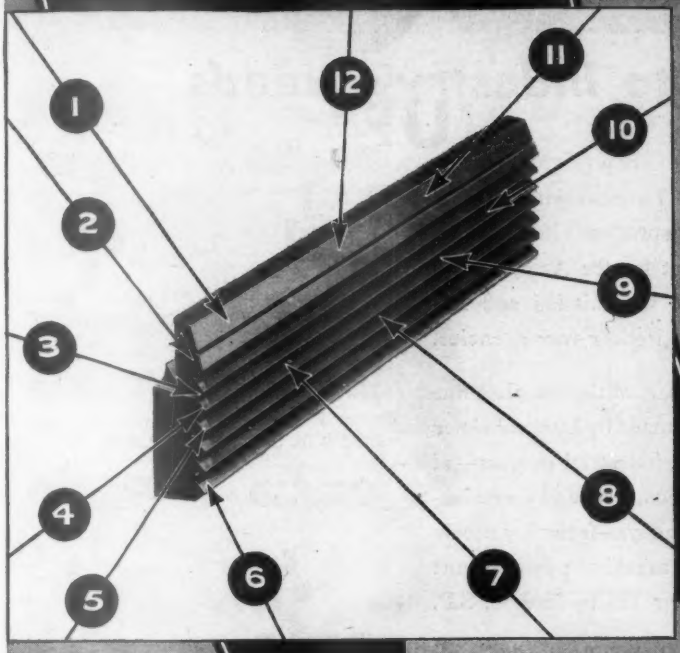


Modern methods speed up preparation of plates and permit uninterrupted use of plate rolls.

The use of automatic equipment in the preparation of steel plates for the rolling and welding into heat exchanger and pressure vessel shells helps the war effort.

AMERICAN LOCOMOTIVE COMPANY
ALCO PRODUCTS DIVISION
30 CHURCH ST., NEW YORK, N. Y. DUNKIRK, N. Y.

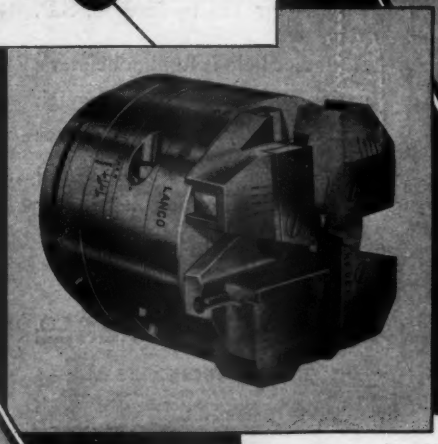
Acclaimed..
The Finest Thread Cutting Tool in Industry



The LANDIS CHASER

Used Exclusively in LANDIS Die Heads and Threading Machines

LANDIS



1-Permanent throat permits close to shoulder threading throughout life of chasers

2-Rake angle range covers all machinable materials

3-Free cutting condition permits maximum cutting speeds

4-Simple grinding operation renews entire cutting edge and leading feature

5-Line contact with work lessens friction and minimizes thread distortion

6-Leading feature insures thread of accurate lead

7-Lateral absorption of cutting strain reduces vibration and chaser breakage

8-Right and lefthand threading feature reduces chaser equipment

9-Standard chasers thread all diameters with proper chaser holders

10-Interchangeability of chasers lowers operating cost

11-Chaser length provides exceptionally long life and low tool cost

12-Permanent throat gives equal distribution of cut

The life of the Landis Chaser, due to its design which makes it possible to machine the thread form along the entire length of the chaser, is from ten to twenty times that of the hobbed type die.

The cutting edge is renewed completely at each regrinding thereby maintaining the original accuracy of the chaser. The throat is not altered by regrinding and therefore permits close-to-shoulder threading throughout the life of the chaser.

Landis Chasers are interchangeable—any one of a set may be replaced.

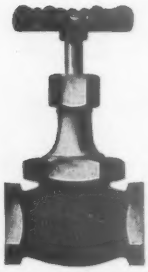
LANDIS MACHINE CO. Waynesboro, Pa.

REPRESENTED IN THE DOMESTIC OIL FIELDS BY:

Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston, Texas; Murray-Baker-Frederic, Inc., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Lunkenheimer Valves

Vital Helps to Industry's Needs



Bronze "Renewo"
200-300 lb. S.P.

Bronze "N-M-D"
Non-Metallic Disc
150 lb. S.P.

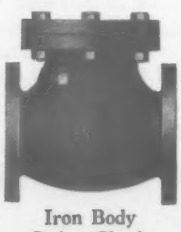
Bronze Gate
Double Wedge Disc
125-150 lb. S.P.

Bronze Gate
Single Wedge Disc
125-300 lb. S.P.

Iron Body Gate
125-250 lb. S.P.

Iron Body
"King-clip" Gate
150 lb. S.P.

Bronze Regrinding
Swing Check
200-300 lb. S.P.



Iron Body
Swing Check
125-250 lb. S.P.

Illustrated are a few of the many types of Lunkenheimer Valves helping to produce vitally needed equipment for the Army, Navy, Maritime Commission and Air Force and other war agencies.

They're part of the complete line of valves made by Lunkenheimer for every industrial process—of bronze, iron, steel and corrosion-resistant alloys—from tiny needle types to massive power-plant valves—for 125 to 2500 lb. S.P.

A further help is Lunkenheimer's nation-wide distribution through leading supply houses. Wherever there's war activity there's a local Lunkenheimer distributor serving it.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

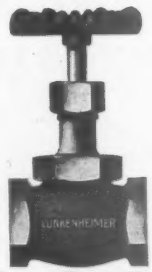
"QUALITY"

CINCINNATI, OHIO, U. S. A.

NEW YORK CHICAGO
BOSTON PHILADELPHIA

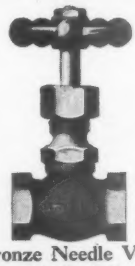
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

Ask for Catalog 78 and the Guide for selecting Valves, Boiler Mountings and Lubricating Devices.

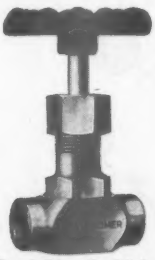


Bronze Regrinding
200-300 lb. S.P.

Iron Body "Ferrenewo"
150 lb. S.P.



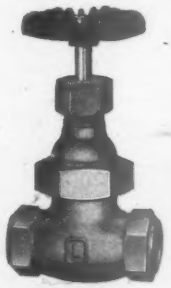
Bronze Needle Valve
200 lb. S.P.



Steel Needle Valve
3000 lb. W.O.G.

Iron Body Globe
125-250 lb. S.P.

Steel Gate
150-2500 lb. S.P.



Steel Globe
Bonnet-Thread-Bushing
600 lb. S.P.

Steel Check
150-2500 lb. S.P.

BRONZE, IRON, STEEL AND CORROSION RESISTANT ALLOY VALVES, 125 TO 2500 LB. S.P.; BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS

YOUR CORROSION PROBLEM CHANGED WITH PEARL HARBOR

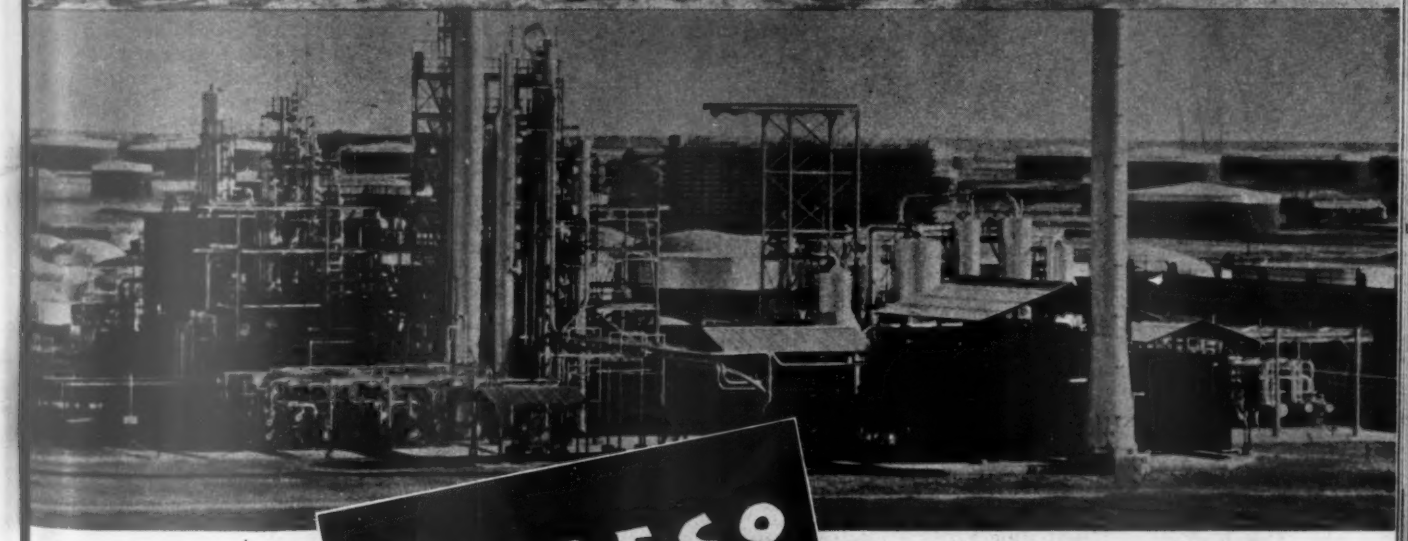
...because the Pearl Harbor attack launched America on its drive to victory... and that drive to ultimate victory changed "business as usual?"

In refineries, in spite of the vital war job they are doing, the scarcity of corrosion-resistant alloy metals is bound to affect heat exchanger maintenance.

Salty crudes are a recognized cause of corrosion and plugging in exchangers. Salt hazards not only exchanger tube life necessary replacements may also lead to inferior products and retarded throughput rates.

Formerly, salt trouble in exchangers was frequently, with the scarcity of quality alloy metals in creasing the impracticability of maintenance plans based on frequent replacements.

The certain way to conserve exchange equipment is to keep salt out. Petreco Electric Desalting adds to the complete satisfaction of many leading refineries. Consult a Petreco representative regarding prevention in your plant.



PETRECO

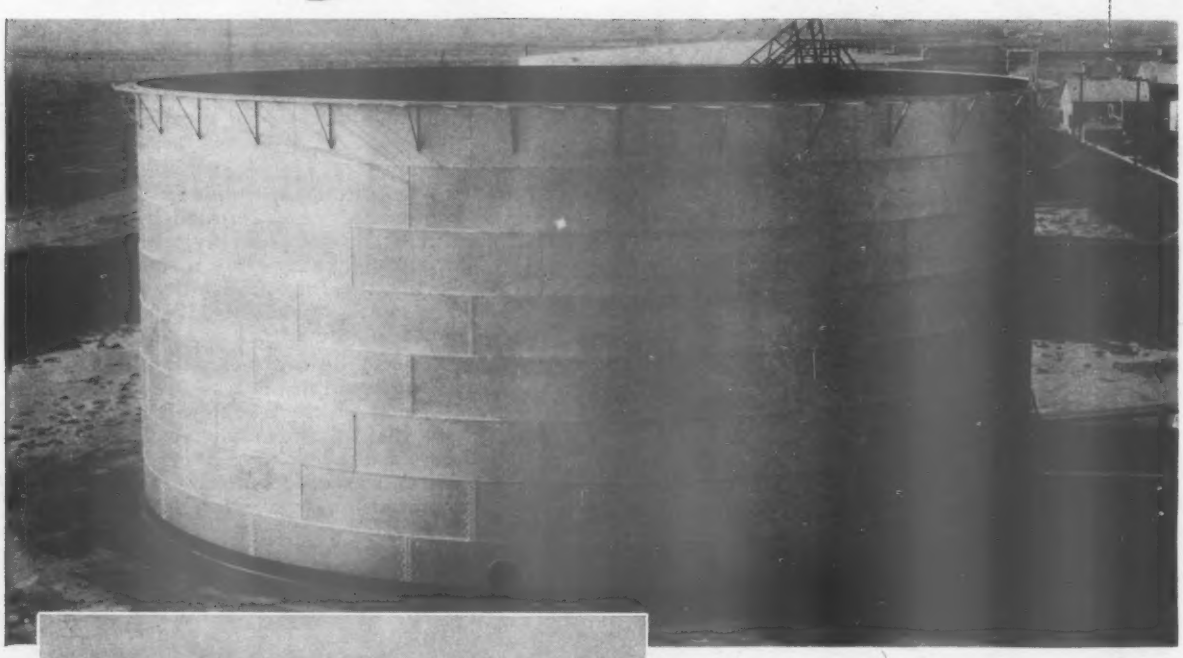
DESALTING DEHYDRATING

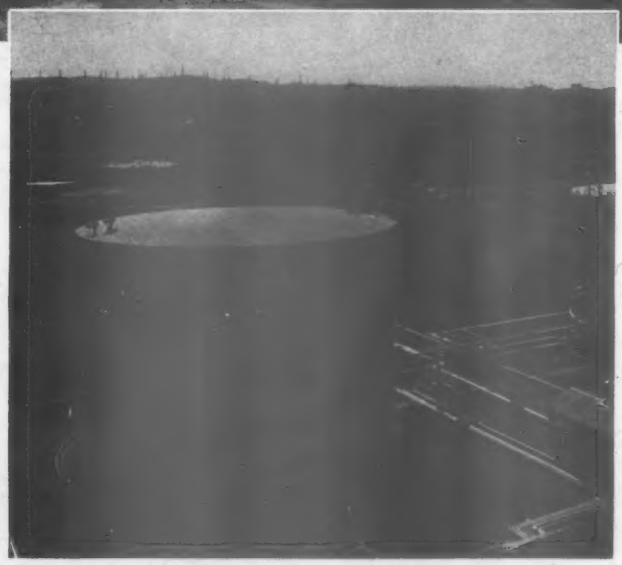
PETROLEUM RECTIFYING COMPANY OF CALIFORNIA

5121 SOUTH WAYSIDE DRIVE, HOUSTON, TEXAS
EDISON BUILDING, TOLEDO, OHIO
530 WEST SIXTH ST., LOS ANGELES, CALIFORNIA
Representatives in all principal fields and refining centers.

WIGGINS PONTOON ROOFS

make these storage tanks efficient, vapor-saving units





EASILY installed on riveted or welded tanks over 15 feet in diameter, Wiggins Pontoon Roofs transform ordinary tanks into efficient storage units in which all filling losses are eliminated, breathing losses are cut to a minimum, and boiling losses are effectively reduced. The principle of operation is simple; the Wiggins Pontoon Roof floats directly on the liquid, eliminating vapor loss during filling and withdrawal. Breathing losses are reduced as no vapor space is provided; boiling losses are minimized as vapor thus formed is trapped beneath deck, to be recondensed as temperatures fall.

ABOVE—A 102 ft. diam. Wiggins Pontoon Roof on this riveted tank provides protection against vapor loss at an oil refinery.

LEFT—The two tanks shown in the background are equipped with Wiggins Pontoon Roofs and are used as working tanks at an oil producing center.

CHICAGO BRIDGE & IRON COMPANY

BIRMINGHAM • CHICAGO • CLEVELAND • WASHINGTON • HOUSTON
NEW YORK • PHILADELPHIA • SAN FRANCISCO • TULSA • HAVANA

Fabricating Plants in BIRMINGHAM, CHICAGO, and GREENVILLE, PA.
In Canada: HORTON STEEL WORKS, LIMITED, FORT ERIE, ONTARIO

LANE-WELLS *Packers*

ARE BUILT TO STAND UP!

LANE-WELLS PACKER ADVANTAGES

1. Multiple Ring Safety Seal-Off
2. Flat Side Rings
3. Easier Running
4. Greater Application Flexibility
5. Increased Expansion
6. Minimum Reciprocating Action
7. Extra Large Slip Area
8. Inside Diameter Same as Tubing
9. Easily Repaired in the Field

GET ALL THE FACTS

Operators in every field can tell you from experience that Lane-Wells Packers stand up under the toughest well conditions to prolong the flowing life of wells and reduce production costs.

Today . . . Lane-Wells "Quinta-Seal" & "Oly" Packers are more than paying their way in thousands of wells because they can be set and reset as often as required. The multiple rings provide a positive seal-off and in more than 15 years they "Haven't Stuck Yet!"

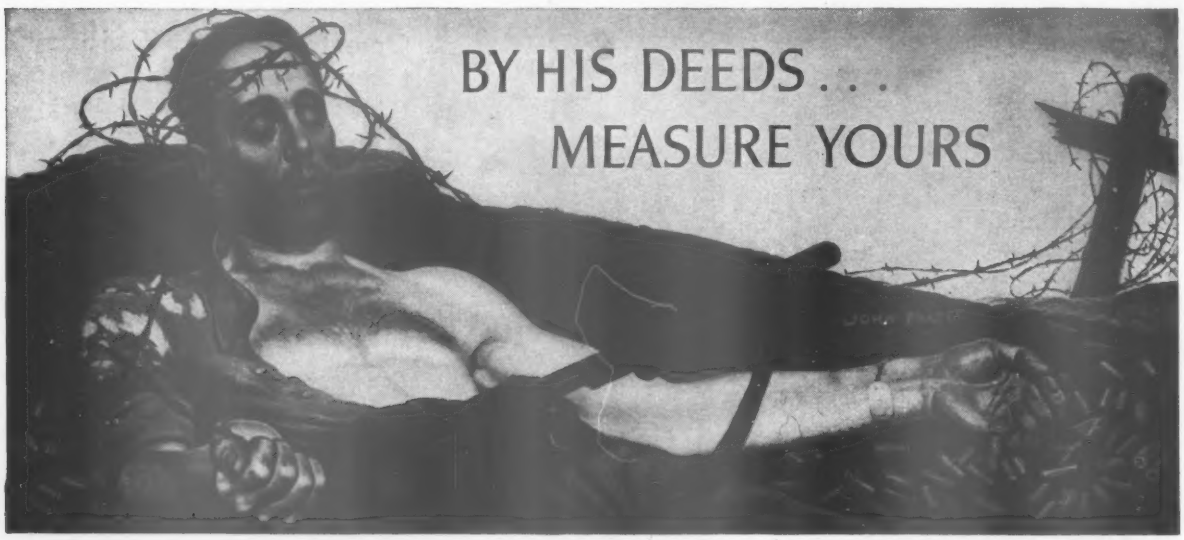
FIGHTING Tomorrow's Tools-Today

LANE-WELLS

REG. U.S. PAT. OFF. LOS ANGELES

MEN DRILL FOR OIL

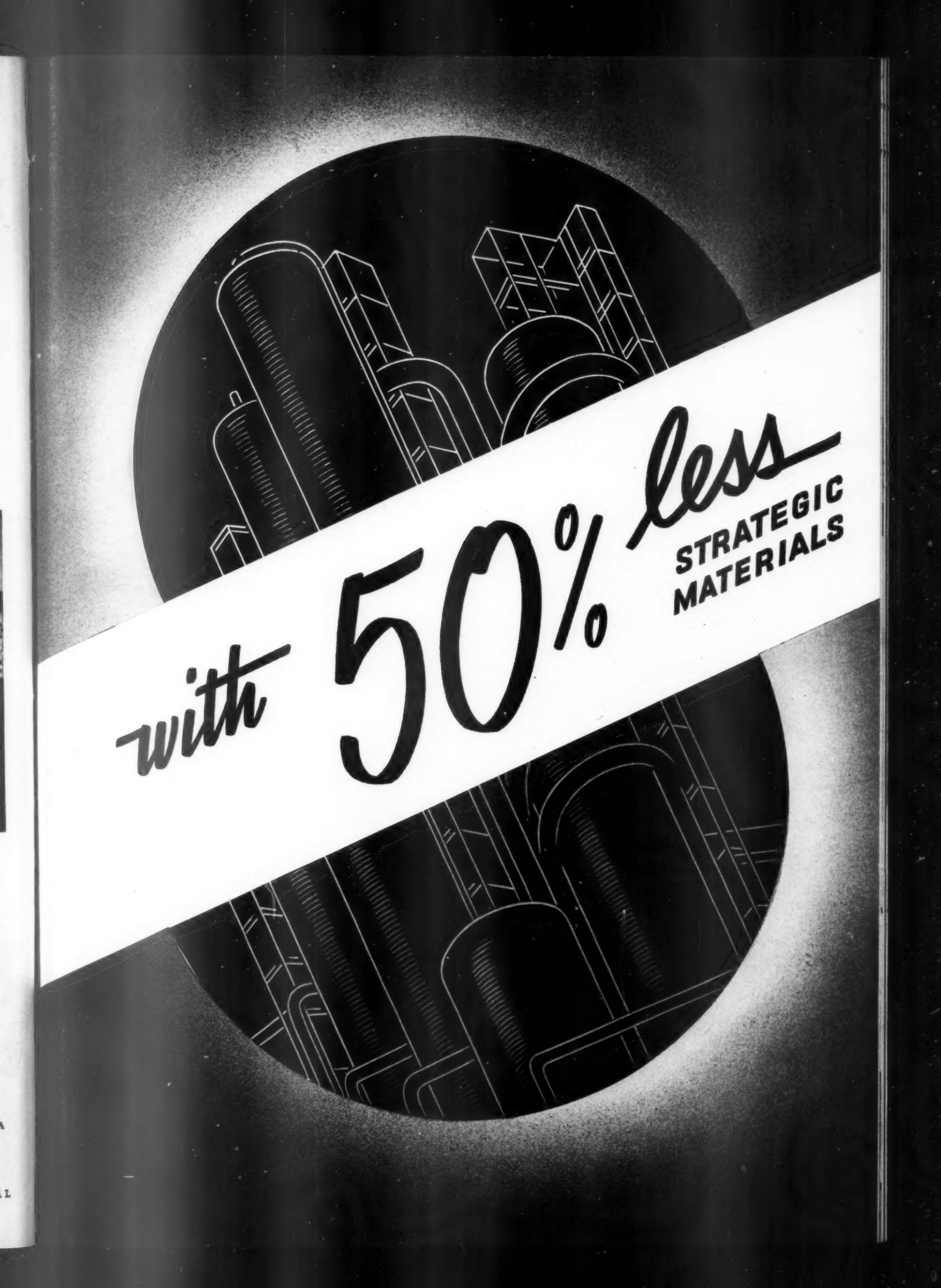
IT is not pleasant to have your peaceful life upset by wartime needs and restrictions and activities. . . . It is not pleasant to die, either. . . . Between you who live at home and the men who die at the front there is a direct connection. . . . By your actions, definitely, a certain number of these men will die or they will come through alive. If you do everything you can to hasten victory and do every bit of it as fast as you can . . . then, sure as fate you will save the lives of some men who will otherwise die because you let the war last too long. . . . Think it over. Till the war is won you cannot, in fairness to them, complain or waste or shirk. Instead, you will apply every last ounce of your effort to getting this thing done. . . . In the name of God and your fellow man, that is your job.



The civilian war organization needs your help. The Government has formed Citizens Service Corps as part of local Defense Councils. If such a group is at work in your community, cooperate with it to the limit of your ability. If none exists, help to organize one. A free booklet telling you what to do and how to do it will be sent to you at no charge if you will write to this magazine. This is your war. Help win it. Choose what you will do—now!

EVERY CIVILIAN A FIGHTER

CONTRIBUTED BY THE MAGAZINE PUBLISHERS OF AMERICA


with 50% less
STRATEGIC
MATERIALS

THERMAL CRACKING UNITS...TOPPING UNITS

Can be Converted to

THERMOFOR CATALYTIC CRACKING PLANTS*

With a Saving of 50% IN STRATEGIC MATERIALS

T.C.C. is the answer to today's problems: a greater supply of source materials for 100 octane gasoline, butadiene and toluol . . . the scarcity of strategic materials . . . the trend in aviation gasoline specifications.

— The addition of reactor, thermofor kiln, catalyst elevators and facilities will convert any existing thermal cracking unit or topping unit to a Thermofor Catalytic Cracking Plant—with a saving of 50% in strategic materials and a comparable saving in investment cost (over a complete plant).

— In the handling of corrosive stocks, less alloy material is required because of the smaller reactors and lesser amount of internals.

— In the construction of complete T.C.C. plants, new design further reduces requirements for structural steel and other strategic materials.

— Recent T.C.C. runs show once-through motor gasoline yields on gas oil up to 62% and new specification aviation base stock up to 35% (on gas oil).

Get all the facts on T.C.C.

THE LUMMUS COMPANY • 420 Lexington Ave., New York
600 S. Michigan Avenue, Chicago, Ill.
2215 Tangley Road, Houston, Texas
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634 S. Spring Street, Los Angeles, Calif.
70 Bank Hill, Wembley Park, Middlesex, England
* Licensed by Houdry Process Corporation

LUMMUS

PETROLEUM REFINING PLANTS

There are lots of them on this desert battlefield and this fellow takes them as they come with no quarter asked or given.

There are plenty of "hot spots" where the steel in the aircraft motors and in the aircraft is subjected to high stresses and high temperatures.

Timken Alloy Steels are playing an important role wherever American fighting and bombing planes are being used.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Steel and Tube Division

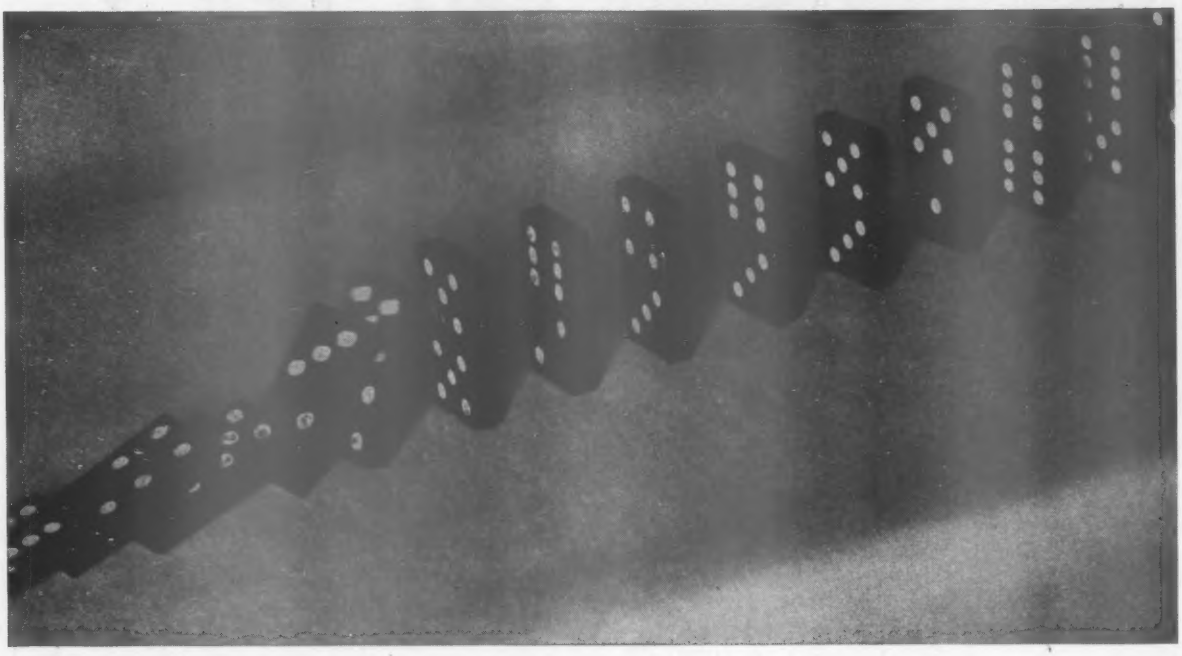
TIMKEN

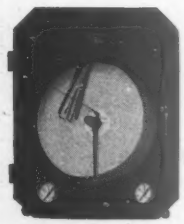
TRADE-MARK REG. U. S. PAT. OFF.

ALLOY STEELS

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

HERE'S WHAT HAPPENS WHEN YOU DON'T HAVE TAYLOR AUTOMATIC CONTROL





The Taylor Fulscope Controller offers you "not 1 but 5" forms of control in one instrument.

THIS is the best picture we could think of to show you what happens in ANY plant where material flows continuously, undergoing processing in one unit after another . . . and why the remedy is *Taylor Automatic Control!* Disturbances at one point generally cause trouble right down the line; and sometimes in preceding operations as well!

This isn't your fault, as you well know. It's not your fault either that disturbances are always happening . . . that batch operations affect continuous operations. The truth is, not even the best operator can be expected to keep his station operating most efficiently with a series of upsets continuing all along the line.

Taylor Automatic Control Systems attack the problem in two ways:

1. *They maintain constant conditions at several key points so that disturbances are localized.*

2. *They smooth out the effect of unavoidable changes. Succeeding operations are affected so gradually that they can easily absorb the change.*

* * *

Whatever your processing problems, why not find out how Taylor Instruments can speed production and improve quality? Let your Taylor Field Engineer tell you the full story! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow, and liquid level.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

★ KEEP ON BUYING U. S. WAR BONDS AND STAMPS ★

GIVE THE ENGINE A BREAK!

WHATEVER type of "Caterpillar" Diesel equipment you operate, it's powered by a great engine. Thousands of veteran "Caterpillar" units are doing a heroic job in these trying times—carrying on with sturdy efficiency long after their ordinary life span.

It's the many *extra* qualities built into all "Caterpillar" Diesel Engines that are proving their worth today. They're simple, dependable, as nearly free from operating adjustments on the job as possible. But if you expect to get the utmost out of your engine, it's up to you to do *your* part.

FIRST OF ALL, YOU SHOULD READ THE INSTRUCTION BOOK AND RE-READ IT

Lubrication is important to engine life. Use the correct grade of oil, and be sure to change the oil and filters at proper intervals, as indicated by the hour-meter.

Don't forget to keep the fan belt properly adjusted.

See that the cooling system is tight, and put in enough anti-freeze to give positive protection in winter.

Keep the air-cleaner clean, and remember it needs more attention if dust conditions are bad.

Keep the clutch properly adjusted to avoid slippage, and don't overload the machine oftener than is absolutely necessary.

When repairs or special adjustments are needed, your "Caterpillar" dealer is ready day or night to help keep your engine working. He is equipped for every type of service.

He'll install new rings or recut piston ring grooves and put in wider rings if grooves are badly worn.

He'll etch cylinder liners, removing gum and glaze.

He'll replace bearings when they are worn, and he is equipped to recondition a worn crankshaft and fit it with new bearings, saving many pounds of war-needed metal.

Have him test your fuel injection system to see if it is functioning properly.

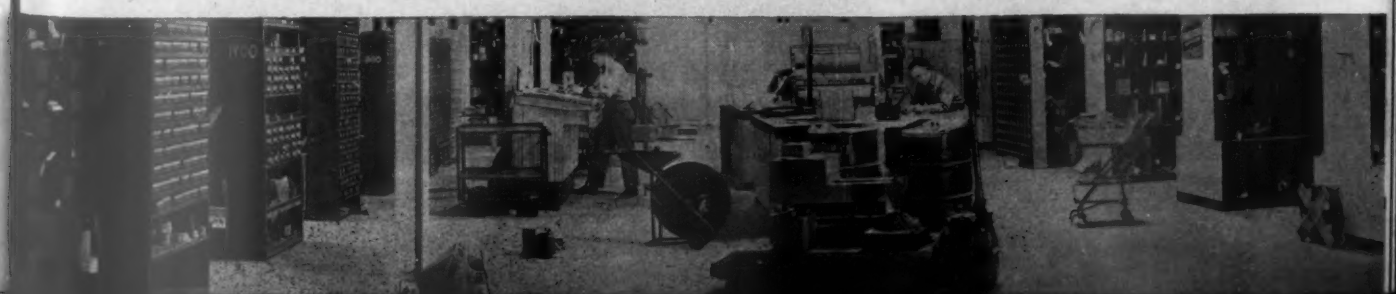
The "Caterpillar" dealer is the best friend your "Caterpillar" equipment has. Wartime conservation of power and materials is his job and he's doing it well. You can count on his sound advice and reliable service, now and at all times.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!



1. Heat Exchangers in the foreground have monel metal shells, admiralty metal tubes and naval bronze tube sheets, floating head covers, and baffles. Vogt Ell Bolts are used on floating head covers.

2. Reactors for catalytic polymerization units being assembled and tested. Each is of welded construction and has bolted-on hinged covers.

3. Group of Diesel Oil Exchangers for a visbreaker. Used to exchange heat between diesel oil and corrosive crude containing salt and sulphur compounds.

4. 62"x30'-6" long Gas Cooler for a catalytic unit in a large refinery. Tube bundle at right is for a second unit.

HENRY VOGT MACHINE COMPANY
Incorporated
LOUISVILLE, KENTUCKY

Branch Offices: New York, Philadelphia, Cleveland, Chicago, Dallas.

"KEEP 'EM PUMPING"

Regardless of Weather Conditions

WITH CENTURY TYPE SCT SPLASHPROOF MOTORS FOR OIL FIELD USE

Century Splashproof Motor driving an oil well pumping unit

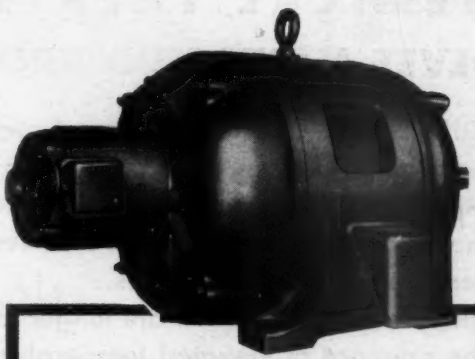
Century Splashproof Motor

Splashproof design assures protection against all climatic conditions. Special torque characteristics to start tough loads and to cushion load shocks on equipment, reduce wear and tear, and prolong equipment life.

Because they reduce maintenance costs on pumping unit equipment and are "weather protected" against the destructive effects of rain, snow, ice, and sleet, these Century Motors provide dependable, continuous performance under the toughest service conditions.

The extensive, world-wide acceptance of Century Type SCT Splashproof Pumping Unit Motors is the result of a close study of the specialized needs of the oil industry.

For full information on all the advantages of Century motors for oil field use, see your regular supply store or call in your nearest Century Application and Service Engineer.



CENTURY TYPE ARRC GENERATORS

Where public service current is not available, Century Type ARRC Generators will provide adequate, continuous, economical power. Depending on the load per motor and size of generator, from 10 to 30 wells can be pumped from one generator.

See your supply store or your Century Application and Service Engineer for all the facts of this dependable, economical source of power.

CENTURY ELECTRIC CO.
1806 Pine Street
St. Louis, Missouri

Offices and Stock Points in Principal Cities

Century MOTORS

319

One of the largest Exclusive Motor and Generator Manufacturers in the World.

STABILITE

CHEMICAL TREATMENT SOLVES MANY MUD PROBLEMS

STABILITE No. 8 is a chemical mud conditioner of exceptional merit in reducing the viscosity and gel strength of drilling muds and in releasing entrained gas. It is also effective in reducing the water loss of flocculated muds.

The effects of STABILITE are longer lasting even in the presence of elevated temperatures.

STABILITE is easy to use. Simply mix the contents of an 8-pound bag in a 55-gallon drum of water and add to the mud in the ditch by means of a valved opening.

STABILITE is packed in 8-pound paper bags—4 bags per case.

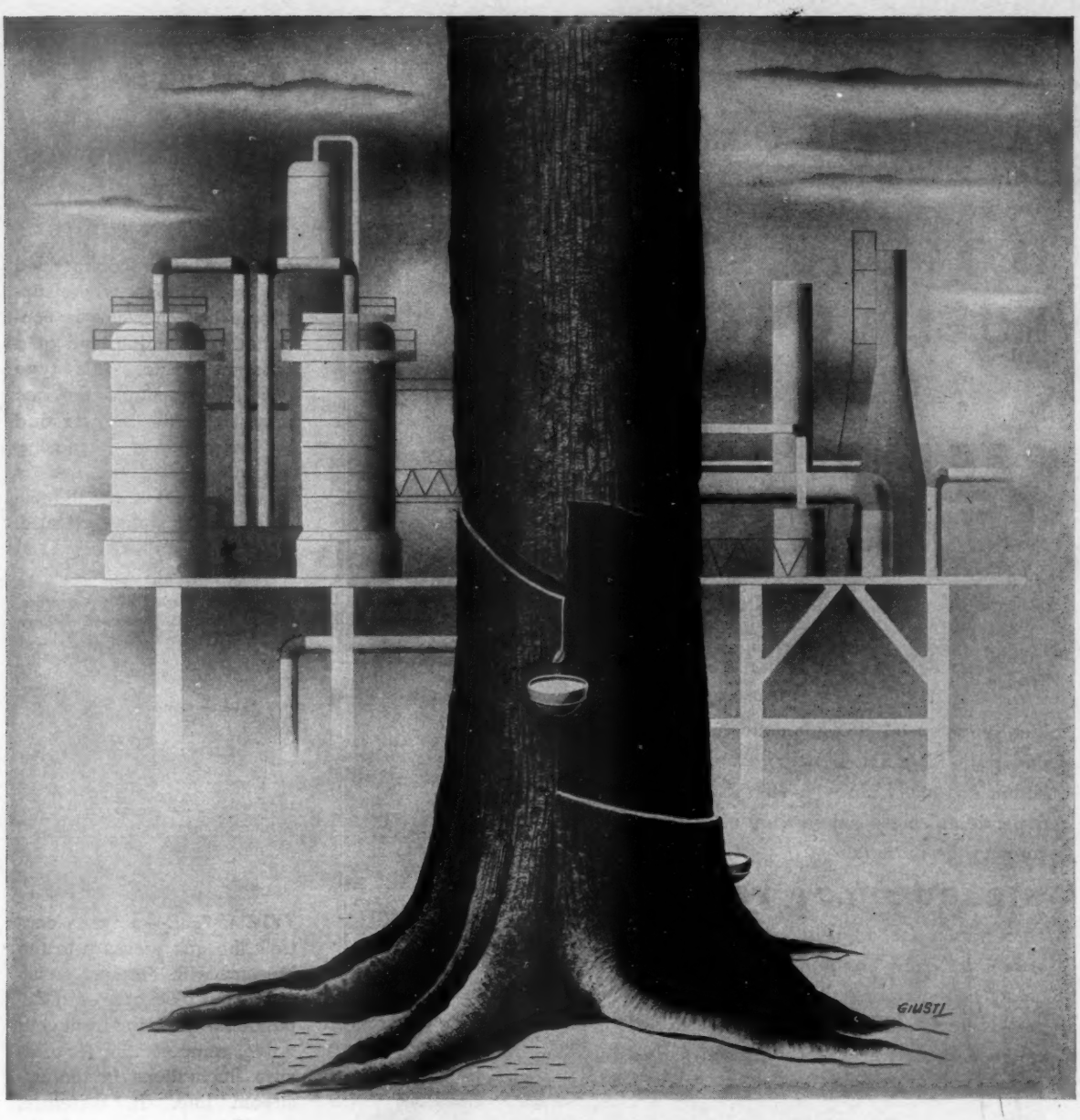
BAROID SALES DIVISION

NATIONAL LEAD COMPANY

BAROID SALES OFFICES: LOS ANGELES • TULSA • HOUSTON

BAROID PRODUCTS

BAROID and COLOX—Drilling Mud Weighting Materials.
AQUAGEL—Gel-Forming Colloidal Drilling Clay.
FIBROTEX—For Regaining or Preventing the Loss of Circulation.
BAROCO—A Salt-Water-Resisting Drilling Clay.
STABILITE—A Chemical Mud Thinner.
AQUAGEL-CEMENT—For Recovering Lost Circulation and Cementing Casing.
SMENTOX—For Counteracting the Effects of Cement Contamination and for Reconditioning Cement-Cut Mud.
ZEOGEL—Used as a Suspending Agent When High Concentrations of Salt or Salt Water Are Encountered.
IMPERMEX—A Concentrated Colloidal Additive Agent for Reducing Water Loss in Salt-Laden Muds.
MICATEX—For Reducing Water Loss to the Formation and for Overcoming Mild Cases of Lost Circulation.
TESTING EQUIPMENT—For Drilling Mud Analysis and Control.
BAROID WELL LOGGING SERVICE—Formation Information Thru Mud Analysis



RUBBER TREES are growing in America

This is a lightning war—a struggle of speeding machines and men. You can't fight and work—*fast*—without rubber. Victory rolls on it!

With most of the world's natural rubber in the hands of the treacherous Jap, America's petro-chemical industries must achieve—almost overnight—huge synthetic rubber production.

Badger is helping to do this big, complicated job. It is co-operating directly with the chemical and petroleum industries in the design and construction of a large percentage of the new plants for the production of Butadiene—a primary material in the manufacture of Buna-S, one of the principal synthetic rubbers.

Behind Badger's ability and wholehearted effort to help America solve the critical rubber problem are years of experience in chemical processing, distillation, fractionation and refining.

This experience also enables Badger to do other important war jobs—building plants and equipment for the production of smokeless powder, T.N.T., alcohol, aviation gasoline and many other strategic materials.

LICENSING AGENTS FOR THE HOUDRY CATALYTIC CRACKING PROCESSES

E. B. Badger
AND SONS COMPANY
BOSTON .... EST. 1841
NEW YORK • PHILADELPHIA
SAN FRANCISCO • LONDON

PROCESS ENGINEERS AND CONSTRUCTORS FOR THE PETRO-CHEMICAL INDUSTRIES

SAFE • DEPENDABLE • ACCURATE

BOILER GAS FUEL CONTROL WITH WIZARD PILOT OPERATED GOVERNORS!

Ideally suited to those applications where it is important to maintain boiler steam pressures within extremely close limits. Wizards assure dependable and sensitive control of gas pressures to the burners.

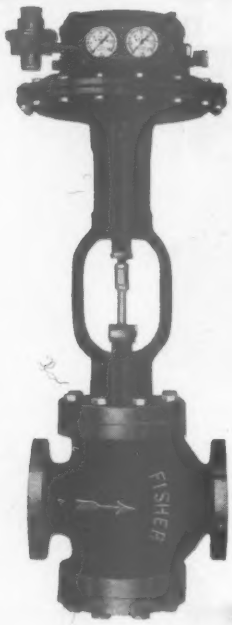
WIZARD PILOT FEATURES

Throttling range adjustment from 1% to 75% of Bourdon Tube Range. Vernier screw adjustment of controlled pressure setting. Pilot mechanism and gauges fully enclosed in weather-proof and gas-tight case. Easily changed from direct to reverse acting or vice versa. Three pilot types available: integral with diaphragm . . . remote surface mounting . . . remote flush mounting.

Main valves designed particularly for pilot operation. Available in all sizes with various inner valve design, either direct or reverse acting for all operating conditions. Write for descriptive information.

☆

BUY *MORE* WAR BONDS!



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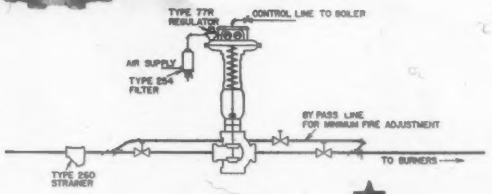
SERIES 4300—recommended for applications where upstream gas pressure is controlled and maintained at a constant value. This type accurately controls the gas pressure to the burners and by increasing or decreasing the intensity of the fire as required, maintains the required boiler steam pressure.

A typical Series 4300 Governor installation is illustrated below.



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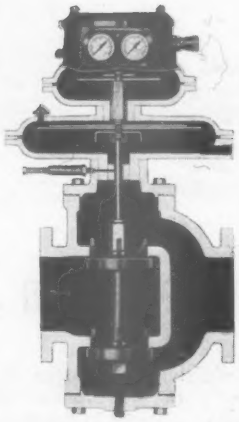
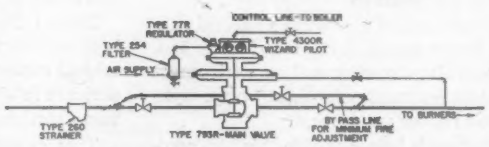


TYPE 43-793R—not only controls the gas pressure to the burners with extreme sensitivity, but also acts as a dependable pressure reducing valve, compensating for pressure fluctuations in the upstream line. It, therefore, provides accurate and dependable steam pressure control even though sharp variations occur in gas supply pressures.

Drawing shown below illustrates a recommended hook-up for the Type 43-793R Governor.



FISHER GOVERNOR COMPANY

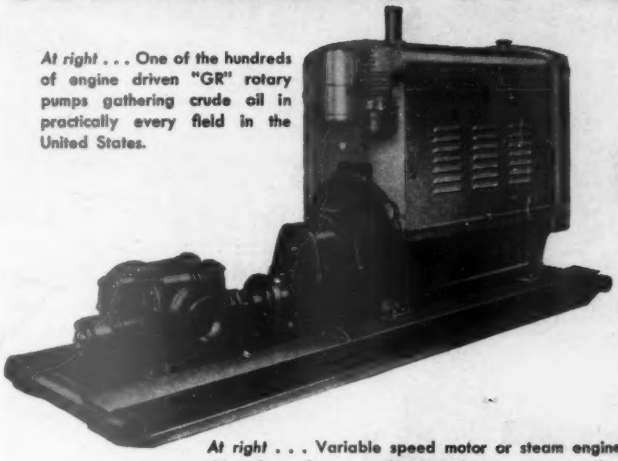
• 248 FISHER BUILDING •

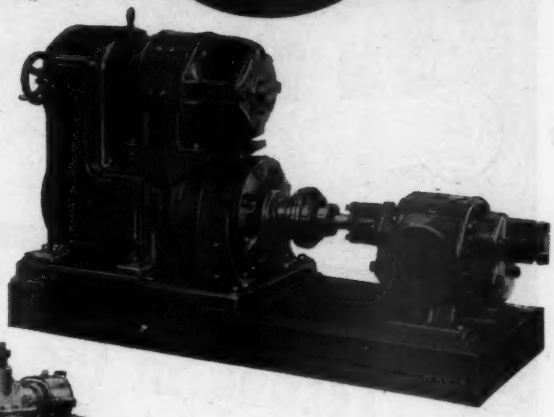
MARSHALLTOWN, IOWA

From GATHERING TO CARGO LOADING

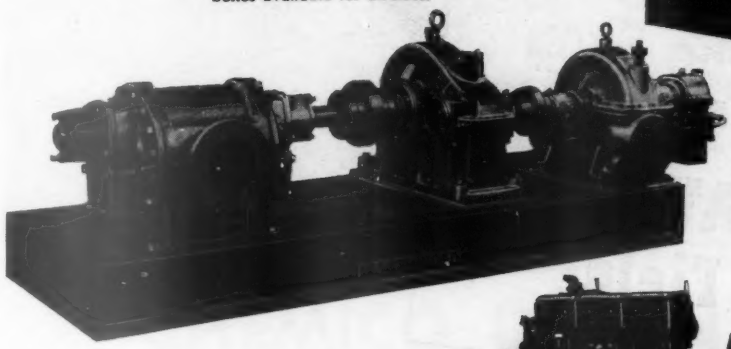
Rotary Pumps

At right . . . One of the hundreds of engine driven "GR" rotary pumps gathering crude oil in practically every field in the United States.

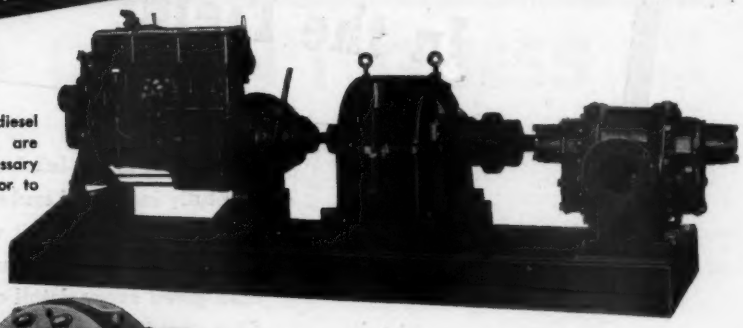




At right . . . Variable speed motor or steam engine drive for refinery applications from greases to hot asphalts or bright stocks. Jackets for bodies or stuffing boxes available for all sizes.



At left . . . Where steam is available to drive these cargo loading pumps Worthington-Moore steam turbines are supplied. This permits variable speeds often required.



At right . . . Two-speed geared with diesel engine or two-speed motor drives are popular for cargo loading where necessary to pump oils of varying viscosities, or to pump out a cold line.

Note the few operating parts. High capacity roller bearings and rotors, and over-size shafts, are features for which these pumps are noteworthy.

RP3-1

Send For
BULLETIN W-487-BIO

WORTHINGTON

WORTHINGTON PUMP & MACHINERY CORPORATION • GENERAL OFFICES: HARRISON, N. J.

Testing in the Shop that is TIME SAVING In the Field

Piping that is pre-fabricated in any of the Midwest shops is carefully inspected and subjected to the most searching tests . . . . tests for which it was necessary to design and build considerable special equipment. This is representative of the care given every detail of Midwest Pre-fabricated Piping.

Also contributing to the saving of time in the erection of all Midwest piping sub-assemblies are the thorough cleaning and the checking to make sure dimensions and alignment are correct. In these days when time is frequently the most precious of all things, Midwest Piping Service is of even greater value.

MIDWEST PIPING & SUPPLY COMPANY, Inc.

Main Office: 1450 South Second Street, St. Louis, Mo. • Plants: St. Louis, Passaic (N. J.) and Los Angeles

Sales Offices: Chicago—645 Marquette Bldg. • Houston—229 Shell Bldg. • Los Angeles—520 Anderson St.
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CHEMICO DOESN'T GUESS

CHEMICO recommendations . . . designs . . . processes . . . for the recovery or production of sulphuric or other acid . . . are based upon a solid foundation.

This foundation includes 29 years of specialized experience . . . the results obtained from installations in every industrial country in the world . . . unequaled resources and facilities . . . and the combined skill of a staff of acid technologists of world-wide reputation.

Therefore, when you bring your acid recovery or production problems to CHEMICO, you know CHEMICO won't guess. Their advice is authoritative and is backed by overall guarantees of performance of all CHEMICO processes and equipment.

The entire CHEMICO organization is now engaged in furthering the national war effort and is at the service of any company requiring acid production or recovery for war purposes.

CHEMICAL CONSTRUCTION CORPORATION

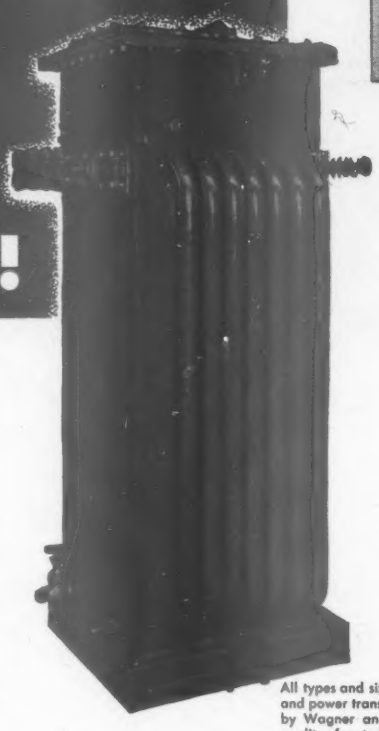
30 ROCKEFELLER PLAZA • NEW YORK

Cables, Chemiconst, New York • European Representatives, Cyanamid Products, Berkhamsted, Herts., England

CHEMICO PLANTS are PROFITABLE INVESTMENTS

For Safety's Sake...

WAGNER TRANSFORMERS!



Fire is one of the outstanding menaces to industry's increased war production. Every precaution should be taken to eliminate this hazard, and Wagner Noflamol transformers can help, because they are filled with a non-inflammable, synthetic liquid.

Because Wagner Noflamol transformers are protected against fire hazard they can be installed indoors without the use of expensive fire-proof vaults. They also save valuable floor space since they can be placed in out-of-the-way places.

In addition to the Noflamol transformers, Wagner builds all types and sizes of distribution and power transformers. Full information will be given on request.

All types and sizes of distribution and power transformers are built by Wagner and the same high quality of material and workmanship goes into the construction of each one. Bulletins TU-33, TU-180 and TU-181 give complete information on Wagner Transformers.

TO INSURE SAFE, DEPENDABLE DRIVES... USE WAGNER MOTORS

Wagner HP motors are designed and built to give many years of trouble-free service under the most severe operating conditions to which explosion-proof motors are likely to be subjected.

Your best protection against production delays on all motor-driven equipment used in refining and chemical plants is to specify Wagner Type HP Explosion-Proof motors. They have been tested and approved by the Underwriters' Laboratories for Class 1 Group D hazardous locations.

The type HP motor illustrated is only one of the many Wagner motors built to meet the tough operating conditions in the oil fields, refineries, and chemical plants.

FIELD ENGINEERING SERVICE!

HOUSTON, TULSA, LOS ANGELES, CLEVELAND, NEW YORK . . . and all of the rest of Wagner's 25 branches are manned by trained field engineers competent to solve your motor and transformer application problems.

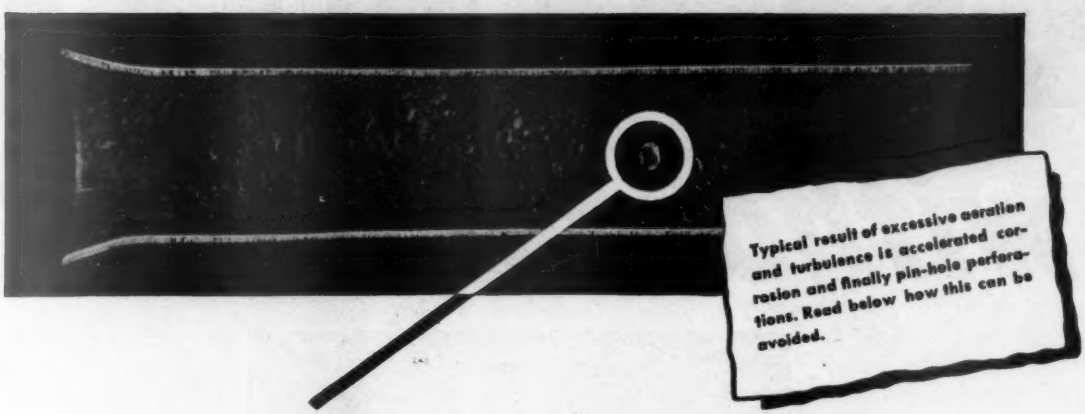
E43-3

● *Send for Complete Literature Today!*

Wagner Electric Corporation

6389 Plymouth Avenue, Saint Louis, Mo., U.S.A.

No. 2—how to prolong condenser tube life


Typical result of excessive aeration and turbulence is accelerated corrosion and finally pin-hole perforations. Read below how this can be avoided.

THIS HOLE, CAUSED BY EXCESSIVE AERATION AND TURBULENCE, COULD HAVE BEEN AVOIDED

Finely divided air bubbles increase corrosion and the effect of turbulence. Worn packing on the pumps allows leakage of air into the water. The water level in the intake canal may be so little above the level of the suction pipe end that eddies form around the pipe and large quantities of air will be intermittently drawn into it. If the water is saturated with dissolved air, differences in pressure in the pump itself may liberate the air which has no chance to redissolve before passing into the tubes. In some places a long intake canal into a shallow tidal basin is impractical and in such cases the water may be pumped twice, once into a supply or surge tank on shore, then to the condenser in the usual way. If the surge tank is small the water pumped into it may be white with entrained air. If such water is circulated to the condenser, corrosion will certainly be rapid. The surge tank should be large enough so that baffles can be placed in it to quiet the water and allow the air to escape before it is pumped to the condenser.

The location of the sea chest on a ship, its size and the construction of the strainer have a marked effect upon turbulence which produces entrained air. Tube life can often be improved by increasing the size of the sea chest, by using a louvre type screen, with slats placed lengthwise to the water flow instead of a woven wire screen. Sharp edges of double plates can be filleted by welding to reduce turbulence. Even after all practical precautions have been taken there may be some air in the water.

If the water inlet of the condenser box is too narrow there may be great differences in water velocity due to eddies. Entrained air will collect in the quietest water, then pass through the tubes to cause failures in definite locations. If the condenser is a "double pass" with a horizontal web in the center, it will often help to drill a few holes in the web where pockets of air collect, thus by-passing some of the water and most of the air to the outlet water box.

A request on your letterhead for more complete information on the prolongation of condenser tube life will receive prompt attention.

ANACONDA

Anaconda Condenser Tubes

THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Connecticut

Subsidiary of Anaconda Copper Mining Company. In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

CEMENTED *without a hitch!*

CEMENTING on one of the best producing wells in the Neale Field, Louisiana, went through without a hitch. Here is the history:

Total depth 11,780′. To cement the 5½″ O. D. casing in an 8⅝″ hole, 1200 sacks of *improved* Unaflo cement were used at 16.5 lb. per gal. Mixing and placing took 97 minutes. Bottom hole temperature 240°F. Pump pressure 1600 lb.

The superintendent states, "Cementing went along beautifully, and well is an excellent producer."

Unaflo, the original retarded oil-well cement, has made enviable records on all kinds of jobs. *Improved* Unaflo, the result of constant research in the laboratory, in the plant, and in the field, is better still. It is more uniform in composition, more uniform in reaction to different mixing waters found on different jobs, more uniform in retardation of setting time at different hole temperatures. With *improved* Unaflo, the stiffening of slurry is not merely "slow." It is delayed, postponed, *retarded.* Thus it does not congeal, but remains fluid and pumpable for the entire period of retardation, after which it hardens normally.

For safe cementing for day-to-day jobs as well as on tough jobs, use *improved* Unaflo. Get it from your dealer. Universal Atlas Cement Company (United States Steel Corp. Subsidiary), Amicable Building, Waco; Oklahoma City; Kansas City; Chicago; Birmingham.

American Cable TRU·LAY *Preformed*

...is a SAFER ROPE TO HANDLE

Believe it or not, industrial accidents cost the United States (last year) 37,500,000 forty-hour *weeks* of productive time. The interest of our national welfare demands that nothing be left undone to reduce this terrific toll. Look: that amount of productive time is enough to build 8 more battleships, plus 40 more destroyers, plus 3600 more bombers, plus 16,000 more tanks. It is your patriotic duty to do everything possible to protect yourself and others from accidents—that we may produce more weapons of victory.

One way many operators have reduced time-out accidents is through the adoption of American Cable TRU-LAY PREFORMED WIRE ROPE. American Cable TRU-LAY is a *safer* rope to handle because it is preformed. Being preformed, TRU-LAY is flexible, tractable, willing to do what is required of it without crankiness. It resists kinking and snarling and possesses remarkable fatigue-resistance. More than this, broken crown wires in TRU-LAY PREFORMED do not wicker out to jab and tear workmen's hands. That is one of the big reasons why TRU-LAY PREFORMED is a safer rope. For your next line, specify American Cable TRU-LAY PREFORMED. All American Cable ropes identified by the Emerald Strand are made of Improved Plow Steel.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, San Francisco, Emlenton, Pa.
Distributors in all important oil field centers

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

"HARD-SHOOTING"
McCULLOUGH
EXACT SPACING
GUN PERFORATOR
McCULLOUGH TOOL COMPANY

MAINTAIN Irreplaceable Equipment

Self Preservation is the first law of nature, and today it is a guiding principle in good business management. Oil companies have for years enjoyed the reputation of being "tops" in management.

Knowing that they cannot replace present safety and conservation equipment . . . and that the same forces of destruction are always at work . . . we urge that even greater stress than ever be laid on careful maintenance.

Keeping equipment clean, removing dirt and corrosion, protective painting, proper adjustment and lubrication . . . these are all factors enhancing the longevity of critical equipment.

So, if you can't get any more, we'd say it's good business to take special care of what you've got.

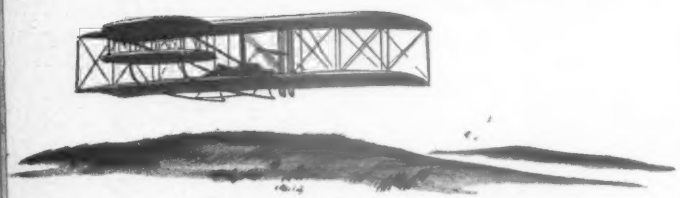
SHAND & JURS CO.
BERKELEY · CALIFORNIA

NEW YORK CHICAGO HOUSTON LOS ANGELES SEATTLE

SHAND & JURS

ONLY EXPERIENCE

fosters special skill



Specialized skill and knowledge obtained through years of pioneering experience are the unseen assets determining the success of any technical service. Oil Well Chemical Service is no exception to this rule.

Dowell is a pioneer in oil and gas well chemistry. It has had more than a decade of oil field experience. Back of its carefully engineered equipment stands a wealth of skill and knowledge gained by treating many thousands of wells.

Contributing to further advancements in this field is Dowell's parent organization, The Dow Chemical Company. Dow's nationwide facilities and expert scientific knowledge assist Dowell in solving oil production problems.

Dowell's pioneering experience has secured an international reputation for dependability and success.

DOWELL INCORPORATED
Executive Office: Midland, Michigan
General Office: KENNEDY BLDG., TULSA, OKLAHOMA
Subsidiary of The Dow Chemical Company

Look to **DOWELL**

FOR OIL AND GAS WELL CHEMICAL SERVICE

Official U. S. Army Photo

Here's What It Takes To Build Your Glory Road

When a Colonel of engineers said the new Alcan Highway—the "Glory Road of America"—was built by "guts and tractors" he stressed the former.

ALTER EGO: And how right he was! When tough "competition" from the west threatened to annihilate us, it jolted us into super-action. Alcan's 1800-mile route through uncharted wilderness — said to be *impassable* — was a confusion of mud, mountains and mosquitos. Under the spur of Jap "competition", we finished this "glory road" in one season.

Maybe that's a lesson for us to be on the alert for the tough competition that'll invade all business after the war. Let's jolt ourselves into super-action now.

ALTER EGO: Right! We've got to hack through plenty of uncharted wilderness that seems impassable . . . with little time on our hands . . . and come out with *better products* and *lower costs* than the other fellow. *Will-power* and *ingenuity* will build *this* "glory road".

We have the will-power. Let's acquire the ingenuity by improving our welding knowledge *with Lincoln's aid.*

Ask your inner self if welding knowledge isn't the shortcut to postwar success.

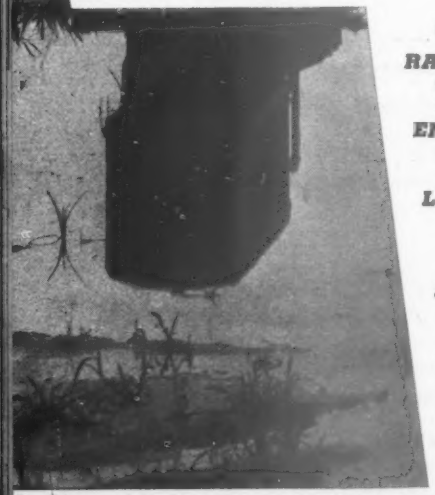
THE LINCOLN ELECTRIC COMPANY • CLEVELAND, OHIO

DON'T WAIT FOR COSTLY BREAKDOWNS!

Start Regular Engine Maintenance NOW!

REGULAR engine maintenance is simple "preventative medicine" that licks trouble *before* it starts. Does it pay? Here's a typical comment from a BUDA owner: "We have operated a Buda engine in steady use for more than *9 years* and it is doing such a good job we believe it deserves comment. This engine was put in service July 11th, 1933, . . . has never been rebored . . . shut down only for *regular 15 day maintenance service* at which time valve clearances were checked, greasing, oil changes and all other service work was done."

Properly applied to the job, BUDA Oilfield Engines — *designed* for Oilfield service — offer years of unfailing, low-cost power. Get the *most* out of them by providing *routine maintenance inspection and adjustment — it pays!*



OPERATOR'S ROUTINE ENGINE MAINTENANCE

RADIATOR: *Check level regularly and keep filled with good clean, soft water. Keep clean inside and outside.*

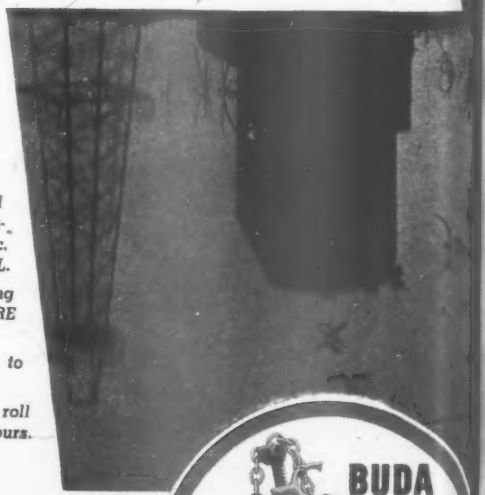
ENGINE WATER TEMPERATURE: *Maintain at 170 to 180 degrees F. Low temperatures result in increased engine wear and maintenance costs.*

LUBRICATING OIL: *Stop engine and check oil level gauge every 8 hours. Frequent oil changes are recommended, depending on operation conditions, filters, etc. THERE IS NO SUBSTITUTE FOR GOOD CLEAN OIL.*

AIR CLEANER: *Change oil every 175 hours, using good clean light weight lubricating oil. IN SEVERE DUSTY CONDITIONS CHANGE DAILY.*

OIL FILTERS: *Change cartridge when oil begins to darken. Keep extra cartridges readily available.*

FAN PULLEY BEARING: *Lubricate with ball roll grease. Keep reservoir full. Check every 175 hours. DO NOT EXCEED RESERVOIR CAPACITY.*



THE BUDA COMPANY, Harvey (Chicago Suburb) Illinois

STYRENE BUTADIENE AVIATION GASOLINE

They're all the same to

The more than 100 ISO-FLOW* Furnaces put into operation and under construction during 1942 for the manufacture of Styrene, Butadiene, Aviation Gasoline, Toluene, Lube Oils, required 30-50% less critical materials than for conventional box type furnaces.

*Trade Mark. Patents issued and pending.

PETRO-CHEM
Development Company, Inc.
120 East 41st Street, N. Y.

★

Representatives
BETHLEHEM SUPPLY CO.,
Tulsa, Houston, Los Angeles
FAVILLE-LEVALLY Corp., Chicago

Geared to the tempo of each new day . . .

FLEXIBILITY always has been a keyword with folks in the Utility Electric Power Industry. They pride themselves on the fact that electric service is something which can be adapted to almost any need, and now in these strenuous times, they prove it further.

Urgent calls requesting . . . "more kilowatts out at the new [redacted] refinery," and "How about more power immediately for that pipe line station at [redacted]" are being met with heartening efficiency.

Orders coming so fast it would make your head swim. The switchovers . . . the changes . . . to wartime production are terrific, but we're "breaking our necks" to keep everyone happy, and liking it!

SAFEGUARD YOUR MOTORS!

- Establish a dated maintenance schedule.
- Check clearance, bearings, contact fingers, control equipment, and oil distribution transformer.
- Check air gap and varnish coils.
- Keep worn out parts for exchange on new purchases.

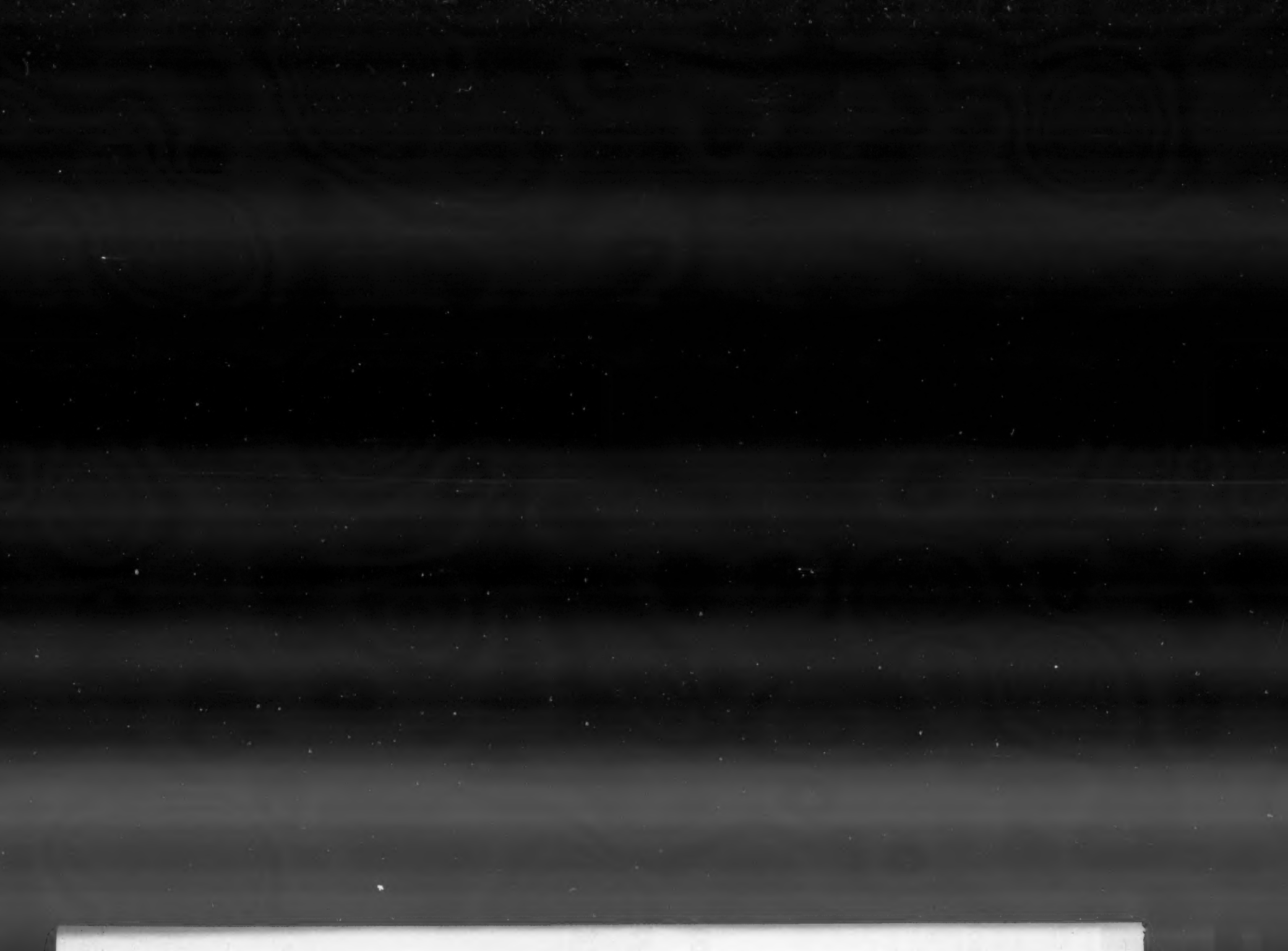
If you are one of the fortunate operators using Utility Electric Power, you know what a worthwhile servant you have at your command. For the sake of victory, use it intelligently and safeguard your electric power equipment to the fullest extent.

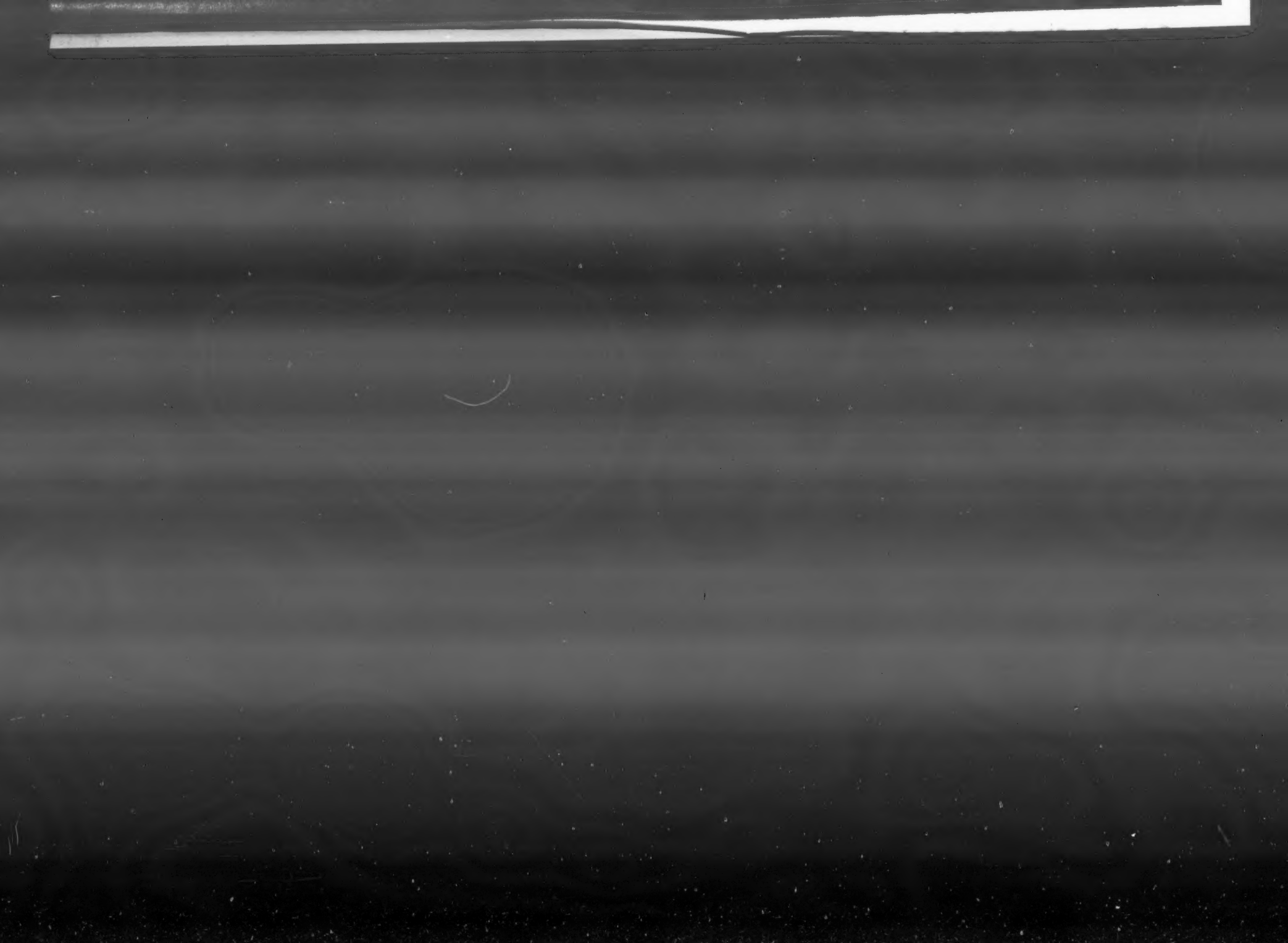
It's power which can be *geared to the tempo of each new day* . . .

IT'S *Dynamite* TO OUR ENEMIES

Use Utility Electric Power!

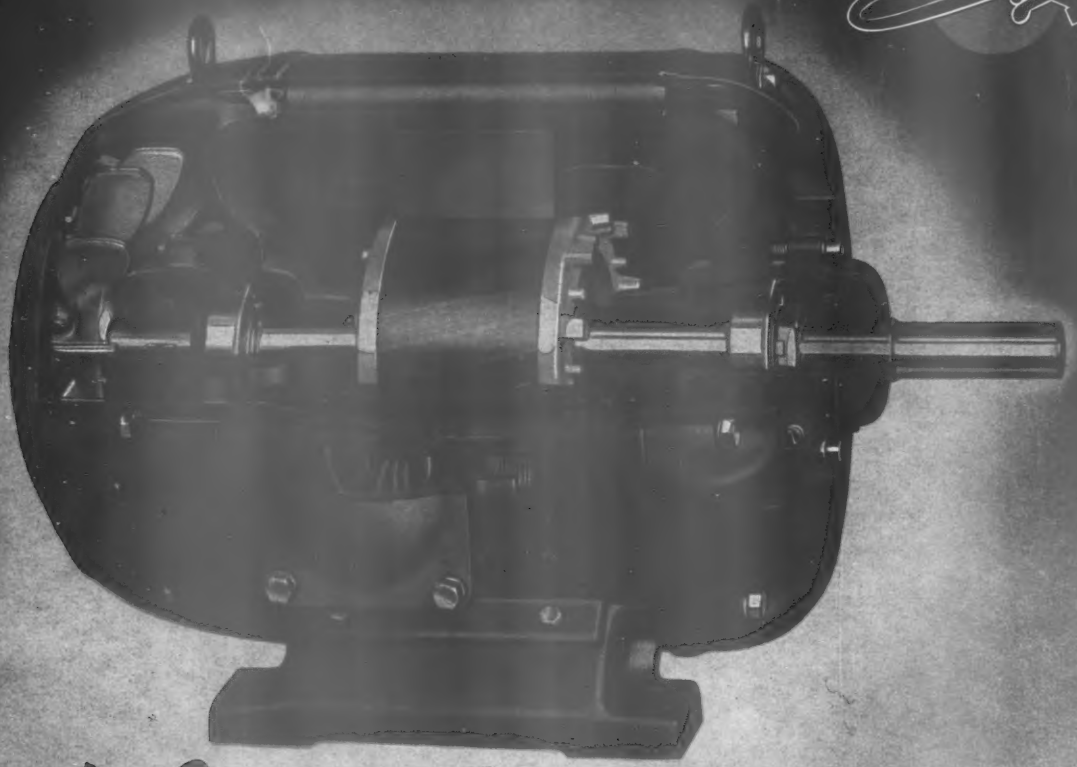
PETROLEUM ELECTRIC POWER ASSOCIATION





THE LOUIS ALLIS CO., MILWAUKEE, WIS.

LOUIS ALLIS



Look Inside!

The Louis Allis **EXPLOSION-PROOF** motor is built to withstand the force of the greatest explosion possible within its heavy iron walls—with a safety factor of *five!*

With a safety factor of FIVE—the Louis Allis Explosion-Proof has twenty carefully designed specific features—features that make available a new high in electric motor efficiency, dependability, convenience and—SAFETY!

We have prepared a sixteen page booklet which completely illustrates and describes all of these important features—write for your copy—ask for Bulletin No. 508-E.

LOOK INSIDE—compare Louis Allis Explosion-Proof motor point by point with any others on the market—and we are sure you will agree that—here is the finest explosion-proof motor ever built—bar none!

Specify your next explosion-proof motor by name—LOUIS ALLIS—you will be assured of the most complete protection and dependable performance available.

THE LOUIS ALLIS CO., MILWAUKEE, WIS.

BUY WAR BONDS—BUY THEM REGULARLY.

Portrait of a Man seeking the Answer to "HOW...?"

"How can man effect the maximum recovery of products from Petroleum and Natural Gas more efficiently and at lower cost?"

Fluor wanted the answers to this question. Fluor set out to get them several years ago by creating the Research and Development Division of our Process Department.

Already the quest has borne fruit. From it came a series of patented Fluor processes. Among them, for instance, is *Presaturation*—a process that increases the overall yield of natural gasoline plants with particular present day emphasis on these vital advantages: (1) increased recovery of isobutane and propane in existing or new plants; (2) the use of less critical materials and plant equipment; and (3) lower plant maintenance and operating costs.

From this quest came *Recycling of Stabilizer Bottoms,* a process permitting maximum recovery of desirable, salable hydrocarbon fractions by providing a continuous cycle of a portion of the stabilizer bottom product thus increasing iso- and normal butane recovery.

From it came the *Glycol-Amine Gas Treating Process* for the simultaneous removal of hydrogen sulphide, carbon dioxide and water from gases, producing a sweet gas and resulting in the elimination of hydrate formations in gas transmission lines. Maintenance costs are thus reduced and pipeline life and operating efficiencies are increased.

These Fluor processes, developed in peacetime, have definitely applicable wartime uses. If you do not have the facts concerning them—*write for details!*

Fluor is not content to rest. There are still more answers to "How...?" Better prepared than ever before to find those answers, Fluor has fully equipped and adequately staffed a complete Research and Development Laboratory where the quest continues from experimentation in glass to pilot plant verification.

SINCE 1890

THE FLUOR CORPORATION LTD.

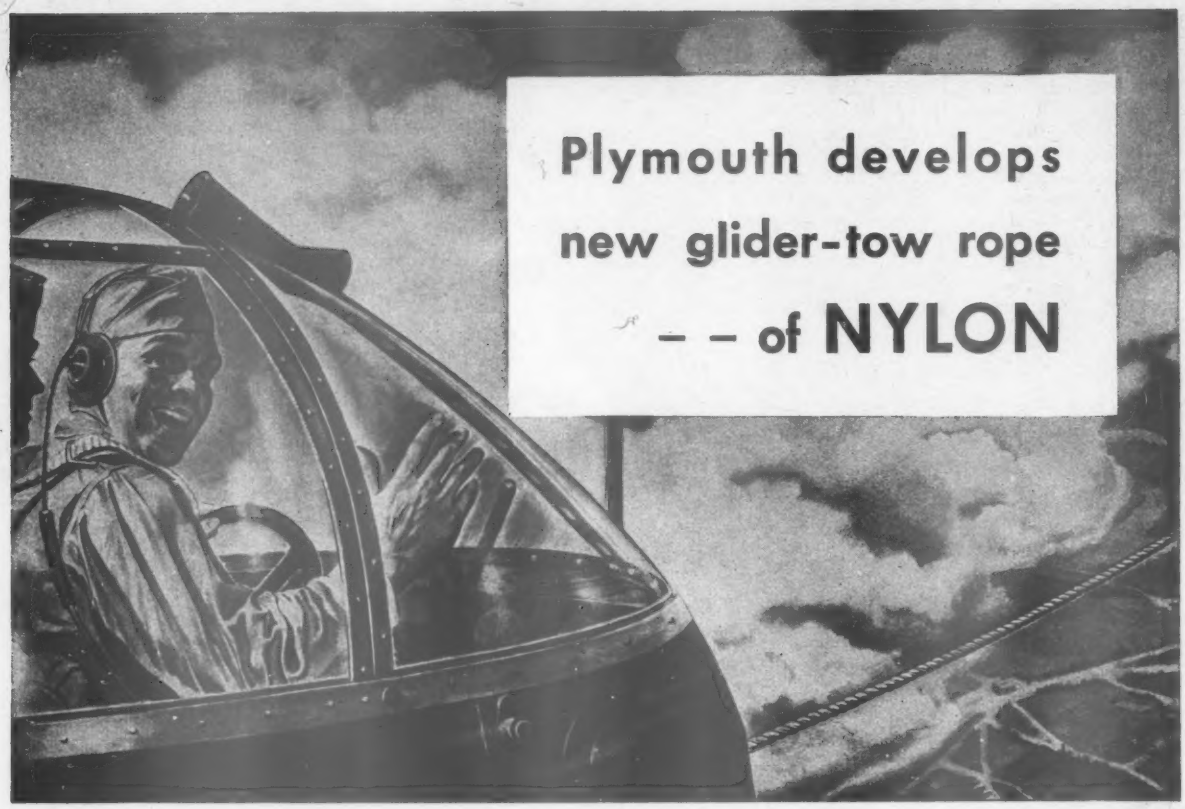
2500 South Atlantic Blvd. • Los Angeles, Calif.

R. C. A. Building, New York • 545 William Penn Way, Pittsburgh • Fairfax Building, Kansas City

Mellie Esperson Building, Houston

DESIGNERS ENGINEERS CONSTRUCTORS

FLUOR



Plymouth develops new glider-tow rope – – of NYLON

Out of the war comes this amazing new kind of rope.

A rope so much stronger and more resilient than any rope ever before made, that its possibilities have only been scratched.

Here's how it happened: For a century Plymouth Ship Brand Manila had been the world's standard. Along came ponderous gliders, to be accelerated at terrific speeds. Something new in rope ratios of strength and elasticity had to be developed.

Plymouth engineers, working with DuPont and the Army Air Force, found the answer in NYLON ROPE.

It so far surpasses other ropes for the purpose that today every pound of Nylon Rope now being produced is used for military operations—including air pickup work and glider-towing.

When the clock strikes "post-war," Plymouth Nylon Rope will be ready, not to replace Ship Brand Manila, but to *take on new jobs that need its amazing characteristics.*

Meanwhile, every effort is being made at Plymouth to ease the Manila Rope situation. Nylon Rope is just one of the many new developments. Watch for further announcements.

PLYMOUTH CORDAGE COMPANY

North Plymouth, Massachusetts *and* Welland, Ontario

Division Offices: New York, Chicago, Houston, San Francisco

Warehouse Stocks: New York, Boston, Philadelphia, Baltimore, Houston, Chicago, San Francisco

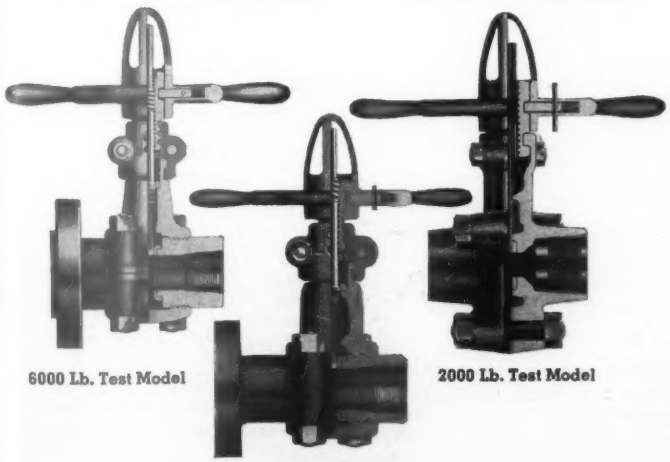
PLYMOUTH

THE *Rope* YOU CAN TRUST

What Goes On in a Mud Line Valve?

Unretouched photograph of a gate packer removed from a Cameron "Flex-Seal" Mud Valve after long service.

"FLEX-SEALS"—3 Models



6000 Lb. Test Model

2000 Lb. Test Model

4000 Lb. Test Model

This picture of a resilient gate packer removed from a Cameron "Flex-Seal" Mud Valve after many months of service graphically illustrates the effect of abrasives and acids on mud line valves.

Conventional valves employing a metal-to-metal seal, when subjected to the abrasive action of drilling fluid, often quickly cut out and lose their seal. As a rule, costly repairs are required to restore them to their former usefulness.

Not so with Cameron "Flex-Seal" Mud Valves whose renewable resilient flow-way insert absorbs the abrasive and erosive action of the fluid and continues to provide a pressure-tight seal until the reserve of resilient material is depleted. When finally worn out, the flow-way insert (which costs only a few dollars) can be quickly and easily replaced in the field with ordinary rig tools by any member of the drilling crew. Renewable steel wear rings protect the hub ends against cutting. The slow-wearing heat-treated steel gate seldom needs replacement because the resilient insert really flows to a seal around the gate even when it is substantially sand cut.

Cameron "Flex-Seals" are the only valves designed expressly for mud line service. Operator's records reveal that they last five times longer and require only one-third the maintenance of conventional mud valves and stop cocks. Try them on your rig for a first-hand check on their economy and operating features.

CAMERON IRON WORKS, INC.

711 Milby St. Houston, Texas

Export: 74 Trinity Place, New York, N. Y.
California: The Howard Supply Co., Los Angeles
Rocky Mountain: Mountain Sales & Service, Casper, Wyo.

"... EXTRAORDINARY HEROISM ... AGAINST AN ARMED ENEMY"

... When surprised by a heavy air attack ... proceeded by automobile, under fire, to his station, where on his own initiative he took off to attack the invading forces, shooting down a dive bomber; with one gun jammed, he pursued and shot down another plane running out to sea. No more enemy planes in sight, he proceeded to a nearby field for fuel and ammunition. Before his guns had been repaired, a second wave approached.

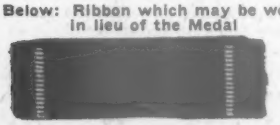
He immediately took off, going to the assistance of a brother officer who was being attacked from the rear; this enemy plane burst into flames and crashed. This attacking wave having disappeared, he found one enemy plane proceeding seaward, which he pursued and shot down.

For such initiative, presence of mind, coolness under fire against overwhelming odds he was awarded the Distinguished Service Cross.

Second ranking decoration for the U. S. Army, the Distinguished Service Cross was authorized by Congress in 1918, to be awarded to persons "who, while serving in any capacity with the Army of the United States, distinguish themselves by extraordinary heroism in connection with military operations against an armed enemy."

Distinguished Service Cross—U. S. Army

Below: Ribbon which may be worn in lieu of the Medal



—HUGHES TOOL COMPANY, Houston, Texas